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bart impact program

A GENERALIZED NO-BART ALTERNATIVE TRANSPORTATION SYSTEM

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The BART Impact Program is a comprehensive, policy-oriented study and evaluation of the impacts of the San Francisco Bay Area's new rapid transit system (BART).

The program is being conducted by the Metropolitan Transportation Commission, a nine-county regional agency established by state law in 1970.

The program is financed by the U. S. Department of Transportation, the U. S. Department of Housing and Urban Development, the National Science Foundation, and the California Department of Transportation. Management of the Federally-funded portion of the program is vested in the U. S. Department of Transportation.

The BART Impact Program covers the entire range of potential rapid transit impacts, including impacts on traffic flow, travel behavior, land use and urban development, the environment, the regional economy, social institutions and life styles, and public policy. The incidence of these impacts on population groups, local areas, and economic sectors will be measured and analyzed. The benefits of BART, and their distribution, will be weighed against the negative impacts and costs of the system in an objective evaluation of the contribution that the rapid transit investment makes toward meeting the needs and objectives of this metropolitan area and all of its people.

DOCUMENT NO. FR 1-14-75 DOT-OS-30176

A GENERALIZED NO-BART ALTERNATIVE TRANSPORTATION SYSTEM

FINAL REPORT

MAY 1975

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PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION

OFFICE OF TRANSPORTATION PLANNING ASSISTANCE
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3 1223 11167 9149

A GENERALIZED NO-BART ALTERNATIVE TRANSPORTATION SYSTEM

BART IMPACT PROGRAM

DOCUMENT NUMBER FR 1-14-75
PREPARED BY MC DONALD & SMART, INC.
UNDER CONTRACT WITH THE METROPOLITAN TRANSPORTATION COMMISSION
FOR THE U.S. DEPARTMENT OF TRANSPORTATION
AND THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
UNDER CONTRACT DOT-OS-30176, TASK ORDER 14
MAY 1975

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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. FR 1-14-75	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle A Generalized No-BART Alternative Transportation System	5. Report Date March, 1975
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
9. Performing Organization Name and Address Metropolitan Transportation Commission, Hotel Claremont, Berkeley, California; with assistance from McDonald & Smart, 303 Sacramento Street, San Francisco, California 94111	10. Work Unit No.
	11. Contract or Grant No. DOT-OS-30176
	13. Type of Report and Period Covered Final Report
12. Sponsoring Agency Name and Address United States Department of Transportation Office of Transportation Planning Assistance Washington, D.C.	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This report formulates the generalized No-BART alternative transportation developments for use in the BART Impact Program. Based upon policy assumptions defining the probable decision environment in the San Francisco Bay Area, alternative transportation developments which are likely to have been implemented in the absence of the Bay Area Rapid Transit system have been identified. The policy assumptions are documented by interviews with decision-makers and documentary research in decision variables such as planning, growth trends, transportation demands, interest group influences, and financing sources.

17. Key Words BART Impact Transportation Alternatives Bay Area Rapid Transit (BART)	18. Distribution Statement

19. Security Classif. (of this report) N/A	20. Security Classif. (of this page) N/A	21. No. of Pages 195	22. Price

Form DOT F 1700.7 (8-69)

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PREFACE

By The
Metropolitan Transportation Commission

This publication describes the Generalized No-BART Alternative (GNBA), a hypothetical transportation system to be employed for purposes of comparison in assessing the impacts of BART. The text, with the exception of this Preface and one Appendix, is the work of the consultants retained by the Metropolitan Transportation Commission (MTC) to formulate the GNBA.

This Preface describes the role that the GNBA plays in the BART Impact Program's overall research design, and the manner in which it will be employed by the various projects into which the Program is organized. Appendix F, also prepared by MTC, presents the results of a brief survey of transportation decision-making in several other metropolitan areas, conducted in order to provide an additional benchmark against which to judge the reasonableness of the GNBA as proposed by the consultants.

To summarize very briefly the results of this work by MTC, the GNBA deemed by the consultants to be the "most likely" to have been produced in the absence of BART consists mainly of expanded and improved bus service in the corridors now served by BART. This GNBA will be used to compare the actual ("BART") state of affairs with the state that is projected to result from the No-BART transportation system.

Building on the experience gained in this process, and subject to further evaluation of feasibility, MTC proposes next to conduct a second-stage projection and comparison in which the Southern Crossing (another transbay bridge) and associated freeways will be added to the GNBA.

MTC's survey of other cities lends support to the most significant conclusion of the consultants, which is that a decision against rapid transit would not be likely to cause much additional highway construction because the funds available for rapid transit would not be available for highways, and other forces working against an expanded highway program (resistance to disruption of neighborhoods, concern for the environment, etc.) would be as strong as ever.

However, MTC finds that there are strong reasons for comparing BART with a transportation system that includes the Southern Crossing and associated highways, both because some knowledgeable observers may still feel that sufficient political backing and funds would have been available to start work on the bridge before the environmental movement attained its present strength, and because such a comparison is needed to provide a more complete assessment of BART's impacts by comparing rapid transit with a second major alternative form of transportation improvement.

A. Purposes of the No-BART Alternative

The No-BART Alternative (NBA) is an important part of the overall research design of the BART Impact Program. The NBA is a hypothetical transportation system and financing arrangement that might have existed if BART had not been built. Its purposes are to assure that the Program keeps sharply focused on the issues of concern to decision-makers, and that the Program does not attribute to BART anything that might actually have occurred even if BART had not been built.

The BART Impact Program is decision-oriented. It is an assessment of the results of the big decision to build BART, and the many smaller decisions that give BART the exact form that it has today. The Program is being undertaken in order to provide information that is needed in making wise decisions in the future, both in the San Francisco Bay Area and in other metropolitan areas that are now considering investment in regional transit.

This means that the research design must carefully examine the conditions which surround the decision of a metropolitan area to build or not to build rapid transit and must ascertain how the consequences of a rapid transit investment differ from what would happen if the decision were to go against rapid transit.

The Program also is striving for a high standard of scientific excellence. Every effort is being made to avoid the shortcomings of past studies of impacts, especially of highways, which have all too often produced exaggerated claims of benefits and have failed to produce findings of a kind that could be applied to decision-making in other places.

This requires that the Program employ a research design that is able to distinguish the impacts of BART from other changes that are simultaneously occurring, and that can trace the impacts to the specific features of BART that caused them.

B. The Inevitability of Comparisons

Any statement about the impacts of BART, or of any other governmental action, implies some kind of a comparison with a hypothetical alternative. Sometimes, a simple "with-without" comparison is implied, as when the visual impacts of an elevated structure are appraised -- the comparison is with the same scene, lacking the structure. In other cases, there is a "before-after" comparison, as when a reduction in highway traffic volumes is attributed to BART -- the implication is that, if BART had not started operating in the interim, volumes would have remained at their former level (or, in a slightly more sophisticated version, would have continued to grow at their former rate). Another comparison is between an impacted area and a control area, as when urban development in areas near BART stations is compared with development in similar areas far from rapid transit -- it is implied that development in the BART area would be more like development in other areas, if BART were not present.

Such comparisons may be useful, if performed with caution, for assessment of impacts of specific parts of the BART system that occurred in small areas within a short time span. But they will not suffice for assessment of the impacts of the whole system, which are spread over a large metropolitan area and take effect over a long time span. In such a comprehensive assessment, simple comparisons of the "with-without," "before-after" and similar types will not be able to distinguish the differences that are due to BART from those that are due to other factors that have been changing at the same time, nor will they be able to trace the BART impacts back to the specific BART decisions that caused them.

In particular, any assessment of BART impacts must recognize that the basic BART decision involved not only the construction of a 71-mile rapid transit system, but the raising of $1.6 billion to pay for it. If BART had not been built, these funds would have been employed in some other way -- perhaps mostly on consumer goods, but doubtless also on provision of other kinds of transportation. Therefore, a comprehensive assessment must compare the BART world with another world which lacks BART but has some other transportation facilities that are not now present.

C. The Role of the NBA in the Research Design

The BART Impact Program, therefore, is employing a research design for the summary assessment of the impacts of the whole BART system, which proceeds by measuring the actual state of affairs (traffic volumes, land uses, etc.) and comparing this with the state that can be expected to have resulted from a No-BART transportation system and a corresponding set of No-BART financial arrangements. The differences are to be interpreted as the impacts of the decision to build BART rather than the No-BART transportation system.

It should be emphasized that some such comparison is a necessary basis for any statement about BART's impacts. If one attempts to avoid this kind of comparison, the result is usually an implicit "with-without" comparison.

It necessarily follows that the impacts of BART depend heavily upon that with which it is being compared. That is, the present ("with-BART") state of affairs differs in one way from the world that would have existed if the Bay Area had invested heavily in highways instead of in BART, and it differs in quite another way from a world in which there was no major transportation investment in lieu of BART.

While this fact may be disconcerting to anyone who seeks some kind of absolute, invariant impact, it accords well with the approach being taken by the Program. We are studying the consequences, not of tracks and trains, but of a past decision, in order to provide guidance for the making of future decisions. A decision is a choice among two or more alternatives, so it can only be assessed by comparing the consequences of those alternatives.

The choice of a No-BART transportation system for use in making comparisons thus becomes a very important matter for the entire BART Impact Program. The Program has devoted considerable effort to assuring that a meaningful alternative or alternatives are chosen. The Metropolitan Transportation Commission contracted with a well-qualified team of consultants to study the history of decision-making that led to BART, and to construct a "most likely" No-BART transportation system in generalized terms. This document describes the Generalized No-BART Alternative produced by the consultants, and gives their justification for it.

This generalized description will next be given to the contractor responsible for the Transportation System and Travel Behavior project, with instructions to prepare a more specific description of the transportation facilities and services included in it. The GNBA also will be given to the contractor responsible for the

Economics and Finance Project, with instructions to prepare a more specific description of the financing arrangements. The result will be an NBA having both physical and financial components.

This NBA, in turn, will be given to each contractor for use in projecting the likely consequences of the NBA -- to TS & TB for projection of travel and traffic on the system; to Environment for projection of its noise, visual character, and other environmental effects; to Economics and Finance for projection of the local tax rates that would have prevailed if BART taxes were not strengthening taxpayer resistance; etc. The results of such projections will be fed from one project to another to permit the tracing of BART's indirect impacts, as for example when TS & TB provides Environment with projections of traffic volumes on the No-BART system for use in projecting air quality in the No-BART world.

Each project then will compare the actual state of affairs, as measured by it, with the state projected to result from the NBA, and will interpret the differences between the two states as the impacts of the choice of BART instead of the No-BART Alternative.

D. Further Refinement of the NBA

As the BART Impact Program's contractors make a start on this work, MTC will be making two kinds of refinement in the NBA for their use. First, MTC will prescribe additional characteristics of the No-BART transportation system, beyond the characteristics of kind, size, and location that are stated in a general way in the GNBA and in more specific detail in the NBA. These refinements will include an effective date for NBA definition of mid-1976 and a more precise description of those features of No-BART express bus service that make it like, or distinguish it from, BART service.

Second, MTC will evaluate the feasibility of employing one or more additional No-BART Alternatives in the research design. The purpose of any additional alternatives would be to provide a more comprehensive perspective on BART impacts, showing how the actual world differs from a world which has a No-BART transportation system quite different from that assumed in the first alternative. The leading candidate for adoption as a second No-BART Alternative is a transportation system with a heavy investment in highways, as discussed below.

In making these refinements, MTC will not be so constrained by the criterion of "most likely in the absence of BART" as were the authors of this document. The "most likely" criterion seemed appropriate, in the first stage of this project, in order to assure that the alternative would be a realistic one, and would therefore give Bay Area decision-makers a valid measure of the consequences of voting for BART instead of against it. But with the passage of time, the BART Impact Program has become increasingly concerned with obtaining findings that are transferable to other cities for the guidance of future decisions.

For this purpose, the alternative for comparison should not be what was politically realistic in the late 1950's and early 1960's, but what is today worthy of consideration for meeting the needs of the 1980's and after. Hence, MTC will be employing alternatives that embody today's concern for environmental preservation, energy conservation, service to minorities and other disadvantaged groups, etc., and that can thereby give today's decision-makers a realistic assessment of the impacts of rapid transit as compared with today's alternatives.

E. The Status of the Southern Crossing

The GNBA, as described in this document, consists almost entirely of improved bus service. It does not contain any new highways parallel to BART routes. This is a remarkable outcome since one might have expected that the Bay Area would have decided, in the absence of BART, to obtain at least some additional capacity along what are now the BART corridors by building more highway lanes. The reason why this was not a likely alternative appears to be mainly a matter of financing arrangements -- the money that was invested in BART would not have been available for highway construction, and the Bay Area's sources of highway funds were fully drawn upon for current highway work, even as BART was being built. The consultants have documented this reason very well. However, there is one possible exception -- a very large one -- which deserves closer scrutiny. This is the Southern Crossing, a proposed new bridge between San Francisco and Oakland.

The consultants find that the Southern Crossing is not likely to have been built, even in the absence of BART, because the bridge project got started too late (for lack of justification and funds, while congestion on the Bay Bridge was less severe and current toll revenues were still being used to pay for construction of various bridges) to avoid the environmentalist movement and general hostility to highway building that became powerful in the late 1960's.

While the case for this point of view is well-stated and documented, MTC feels that, if Bay Area business and political leaders had not made a decision to push for rapid transit as far back as 1956, the proposed bridge would have been viewed in different and far more favorable light at an early date, and planning and design work would have proceeded much sooner. Especially important in the decision-making would have been the Oakland Airport's need for access, which would have stimulated more vigorous and timely support for the bridge by East Bay interests if BART had not been planned to pass near the airport. In the judgment of MTC, the bridge might have moved ahead to financing and construction, in time to avoid the voter hostility which finally killed the project in a 1972 referendum, and in time to be in operation in 1976 (the year for which the No-BART comparisons will be made).

With the Southern Crossing would have come a sizable complex of freeways on both sides of the Bay (not all of them by 1976, however). The result would have been, in lieu of BART, a very heavy highway investment in Oakland and south of it, producing a highway-dominated No-BART Altenrative in that corridor. Since total funds available for highways in the Bay Area would have remained constant, there would have been a corresponding reduction in new highway construction in other parts of the area.

F. A Two-Stage No-BART Alternative

It does not seem profitable to argue over whether the Southern Crossing would have been built in the absence of BART. It is more useful, instead, to recognize the great difficulty in making such "predictions," to concede that strong reasons can be advanced on either side of the argument, to abandon strict adherence to the "most likely" criterion, and to make an asset of this problem by adopting two NBA's for use in comparing with BART -- or, more precisely, by making the comparison in two stages.

The first stage will employ the NBA as described by the consultants in this document. Based on this experience, and after further testing of feasibility, MTC proposes to make a second-stage comparison, adding the Southern Crossing and the associated freeways to the first-stage NBA (without attempting to incorporate any corresponding reduction in new highway mileage in other parts of the Bay Area).

This two-stage approach, rather than two separate alternatives, is dictated by the fact that the bus improvements contained in the first alternative are quite independent of the Southern Crossing -- there is little reason to think that construction of another bridge would have inhibited the provision of improved bus service through the Caldecott Tunnel or south of downtown San Francisco.

The two-stage approach is both a realistic portrayal of two plausible alternative histories, and also a convenient way to conduct the NBA comparisons throughout all parts of the BART Impact Program. Once procedures have been worked out for the first alternative (specific description of the bus system, incorporation in traffic networks, computer simulation of traffic upon it, etc.), they can be repeated for the second (addition of highway elements, incorporation in networks, additional simulation runs, etc.) in a very efficient and economical manner.

The two alternatives will be employed in a selective and stepwise manner, learning from the results obtained at each step and limiting costs by limiting the scope of the analysis. Sensitivity tests of the first alternative will be made, and elaborate analyses will not be pursued where the sensitivity tests produce results that are not significantly different from the BART system. The likely consequences of the second alternative will be evaluated in advance, to provide guidance on how much data and analysis will be needed to make the BART-highway comparisons, and an economical plan of analysis will be devised. The analysis of each alternative may be confined to a single corridor, along with transbay travel, to limit costs. (The bus alternative would be analyzed in the Concord corridor, and the highway alternative in the Fremont corridor.)

The two-stage NBA analysis promises to provide a solid basis of fact for measuring and interpreting the impacts of BART. The two stages represent two extremes of policy, between which would fall the "most likely" system that most people would choose, if they had to make a judgment. The two also represent a good combination of two different objectives of the program: to portray for Bay Area citizens the consequences of their choice of BART in preference to what they otherwise might have done, and to provide decision-makers across the country with information on how rapid transit compares with alternatives that are now under serious consideration in many cities. The results of the two NBA's thus promise to include, or "bracket," the kinds of impacts about which the large majority of users of Program findings will wish to know.

As work on the two-stage NBA proceeds, MTC will explore the possibility of very selective use of other NBA's to throw additional light on BART's impacts. One leading possibility, in view of the sizable financial commitment that a rapid transit system entails, is an alternative method of financing BART. If another alternative is found to promise useful results at reasonable cost, it will be incorporated in the program design as appropriate.

I. INTRODUCTION

Definition of the hypothetical transportation system that is judged most likely to have been implemented in the Bay Area by mid-1975, if BART had not been built, is fundamental to the objectives of assessing the impact of BART. This report formulates a Generalized No-BART Alternative (GNBA) based upon our evaluation of the decision environment in the Bay Area during the past 20 years, the nature of transportation planning during that period, and upon our assessment of forces, both positive and negative, which shape the direction of transportation developments.

The Generalized No-BART Alternative, at this early stage in the BART Impact Program, is intended to be a general identification, on a corridor-by-corridor basis, of the kinds and locations of transportation facilities and services and financial arrangements that would have existed without BART. Refinement of the technical and financial characteristics of the GNBA will occur in subsequent research elements of the BART Impact Program. Further, the generalized No-BART alternative, as we have conceived it, consists of changes in the existing transportation developments which may have resulted from a non-BART environment. Although the GNBA was formulated from evaluating the entire system and its requirements and not just the marginal changes, we have not reiterated in this study improvements to highways, for example, which have occurred despite BART and can be expected to have occurred in the same dimension without BART.

The only limiting criteria established by the BART Impact Program were that the Generalized No-BART Alternative must be capable of being in place and operating by 1976 and that it be non-BART like in nature. Furthermore, it must be consistent with levels and sources of funding and conceivable in terms of an orderly, consistent, and feasible implementation.

This retrospective judging of an alternative future necessarily depends heavily upon documentation and analysis we are conducting in the decision history of BART. Many of the key actors and influence groups of that history of the Bay Area's transportation developments during the past two decades could wield equivalent influence in the transportation decisions of a No-BART scenario. In some cases, these actors might become proponents of BART's alternatives, and in some cases they would not. Moreover, formulation of a No-BART Alternative requires an understanding of the transportation planning process of the Bay region and the sources of financing used by BART or available to its alternative. Thus, we have relied heavily upon our interviews and research into BART's history to hypothesize the attitudes which might have prevailed in the absence of BART.

In recreating the decision environment of the past 20 years, and evaluating the relative forces which support and which deter transportation developments in the Bay Area, several considerations have been instrumental in defining the GNBA: the differentiation of highway and transit improvements in the context of planning, financing and public support.

First, the transportation planning process during the relevant period was not characterized by a comprehensive approach to solving the transportation problems of the Bay Area. Without the stimulus of a dramatic new system, such as BART, neither a regional approach nor multi-modal approach toward transportation planning would have occurred. Even with BART, in the historical perspective the highway planning function continued in isolation from BART's projected impacts. While the cooperation between BART and the Division of Highways on sharing rights-of-way was exemplar of coordinated transportation implementation, the projected travel capacity of BART did not bear on the priorities established for the expansion of the highway network.

Conventional transit planning, related primarily to bus systems, was nearly dysfunctional. Each property planned its expansion in response to its own projected travel demand. Nonetheless, this does not imply a failure. The approach to meeting projected travel demand among interurban bus systems (in the transbay corridors) was adequate to cover the travel demand which BART was considered essential to serve. Since transbay auto traffic has decreased only 5% since BART began transbay service -- and the majority of its patronage has come from other transit modes rather than auto -- it is difficult to argue that the conventional transportation planning process, operating in a rational non-BART scenario, could not have met the travel capacity of BART (although BART apparently has induced increased travel demand). Insofar as organizational considerations are concerned, there is a temptation to determine that should have occurred rather than what would have occurred. It is our opinion, however, that there was little incentive for transit operators to consolidate (with the exception of public agencies acquiring certain private properties). Thus, it is likely that each transit agency which is noncompetitive in its own jurisdiction could have planned expansion to meet travel demand, given the constraints of financing and management inclination.

Counter to the myths of a prodigious trust fund, the expansion of the highway network was constrained financially by increasing costs of construction and maintenance overtaking the increase in projected revenues. As a result, many of the priority highway segments in the Bay Area which have not been completed have been stalled for lack of adequate funding. Without sources of discretionary highway funds which could be allocated to the Bay Area in the absence of BART -- our research discovered no viable ones -- the financial deterrent to highway network expansion has been unrelated to BART's planning and implementation. A number of highways which have committed funds available and a high priority in the programming of the Division of Highways have been halted and remain stalled on legal issues equally unrelated to BART. Thus, the No-BART alternative financially is little different from the BART scenario, since highway funding largely emerges from supra-regional sources relatively insensitive to BART.

Financing of transit improvements in a No-BART scenario is somewhat more complex, particularly since BART's sources of funds were available largely because of its high technology solution. With the exception of A.C. Transit, virtually no transit operator in the Bay Area during the past 20 years has gained the bonding support that BART did. The sales tax financing of BART has been equally inaccessible to other operating properties. Furthermore, the federal monies available to BART were the result of a federal interest in BART's technology and, for the most part, were an exclusive resource of a BART-like system.

This does not mean that federal monies would not have been available to a non-BART system; on the contrary, capital funds for transit systems during the period of BART's implementation were available awaiting meritorious application. Adequate federal financing would have been available for the incremental transit solutions we consider part of the GNBA.

Public and political support -- or the synthesis of various influences -- of the proposed components of the GNBA have been a major consideration in our analysis. Several potential components have been excluded from the GNBA because opposition which is presently stalling them was not judged to have been sufficiently different in a non-BART scenario to permit implementation by 1976. And in some cases, public demand -- in the absence of BART -- might have resulted in the inclusion of a component. This area of subjective evaluation is speculative in nature, anchored in known events reflecting public attitudes. But much in the BART Impact Program can hinge on this judgment of attitudinal trends.

The most significant single subsystem of a potential GNBA is the Southern Crossing. This bridge, on one level, determines whether the GNBA is dramatic or merely incremental. On the basis of extensive research and interviewing, we have concluded it would not have become an element of the GNBA. The forces of opposition which stopped it at the beginning of this decade, in our opinion, would have done the same if it had been planned without BART. Nonetheless, we recognize this as a matter of professional judgment and, given the polarization of opinion on the Southern Crossing's likelihood in the absence of BART, we recommend serious consideration be given to conducting the BART Impact Program analysis under two scenarios, one with the Southern Crossing and one without.

II. THE DECISION ENVIRONMENT IN THE BAY AREA WITHOUT BART: POLICY ASSUMPTIONS

The transportation planning and implementation decisions which have resulted in transportation developments in the Bay Area between 1955 and 1975 have been governed by the decision environment, a synthesis of various tensions and influences brought to bear on each decision by contemporary popular perceptions and activism, commercial and industrial interests, political interactions and necessity, financial realities, and technical feasibility. Similar forces would have affected the decisions shaping a No-BART alternative. Thus, we must hypothesize the decisional environment which might have existed without BART's presence. What alternatives would various interests have supported or opposed? What political or financial conditions would have existed if neither political nor financial resources had been diverted by BART?

The assumptions contained in this section define the framework of both the objective and subjective considerations which condition the feasibility, in non-technical areas, of each of the components of the GNBA studied, including the institutional alternatives. The technical feasibility or characteristics of components is established in Section III.

The gist of this No-BART scenario has been culled from our evaluation of official documents, news accounts, and secondary evaluative sources as well as interviews with key actors in transportation planning in the Bay Area during the past 20 years.

A. Period of Planning and Implementation

The Generalized No-BART Alternative (GNBA) has been defined as a generalized description of the transportation system which would have been in place and operational -- fully implemented -- by mid-1975 (Fiscal Year 1976). Actual planning and implementation may have occurred any time since 1956, when the BART Commission's report, "Regional Rapid Transit," first defined, and alerted decision-makers to, a rapid transit alternative to the status quo or conventional transportation developments. Once BART became an alternative, transportation planning may have consciously anticipated or accommodated BART's development; thus, although the bond issue initiating BART implementation did not occur until 1962, the planning horizon for the GNBA is assumed to begin in 1956.

Recognizing the 20-year planning and implementation period of BART or its alternative, the No-BART scenario cannot be a static one. The decision environment must be conceived, necessarily, as a dynamic one, time sequencing assumptions concerning the influences on decision-makers. For purposes of this evaluation, we have sequenced our assumptions, arbitrarily, in four 5-year periods, i.e., 1956-1960, 1961-1965, 1966-1970, and 1971-1975.

B. General Growth Trends and Transportation Demands

Transportation planning, whether visionary or conventional, responds primarily to travel demand, both existing and projected. Occasionally, as in the case of BART, it is influenced by technological choice as well. Nonetheless, basic to the transportation planning function -- the decisions of how to plan an effective transportation system, including technical choices of modes, routes, and capacity -- is the objective of meeting travel demand. Transportation planning of a visionary scope, which normally would seek a comprehensive solution to transportation problems, will rely on travel demand projections of a distant future (e.g., BART's 20 to 35 year horizons in 1956).

It is assumed, in this scenario, that the planning horizon of typical transit planning bureaucracies -- particularly those for transit systems capable of incremental expansion of service, to meet either increasing or changing demands -- is considerably shorter. The priorities of transportation planners among operating agencies is the provision of service for existing demand and immediately expected demand, not far distant demand. Thus, the incremental system perpetuates itself by not being likely, bureaucratically, to concern itself with the needs far beyond each incremental expansion.

The planning horizon of highway planning, on the other hand, can be considerably longer, particularly in developing the state's ultimate highway plan, as occurred in California in 1958. Those plans, which as much govern future land use as are governed by it, provide comprehensive solutions to travel demand projections. Established in the first 5-year period of the scenario, then, was the ultimate highway network of the region. Regardless of BART, the highway plan had been developed -- ignoring the potential impact of BART according to highway and transit planners. The only variable for highway planning in this scenario becomes the priorities of highway implementation.

In either case, whether transit or highway planning, travel demand projections are the basis for recommended changes in existing systems, unless a technical system decision is made specifying a system with excess capacity, in which case travel demand projections may or may not justify the system decision. In the No-BART scenario, we assume the planning establishment -- comprised of dysfunctional agencies planning the transportation improvements in each of their respective bailiwicks -- responds to rational approaches to expanding the transportation capacity of their bureaucracy's operating system, and does so on the basis of existing or projected travel demand -- of varying future horizons, depending on the nature of the system.

Travel demand projections are based upon population growth projections. If the population growth projections in the BART counties -- Alameda, Contra Costa, and San Francisco -- varied considerably over the 20-year period both in what projected growth would be and in actual growth experience, one might argue that a No-BART alternative with a short planning horizon might adjust incremental improvements according to the contemporary perception of existing and potential travel demands. This would have an impact on the hypothesis that transportation systems control and direct land use -- hence population growth -- since it would permit transportation to respond to land use changes instead of forcing the converse. If this were the case, the No-BART scenario would need to respond to a different pattern of land use than we witness BART serving today. Since many contend BART's influence on land use, by the inherent inflexibility of fixed rail, made the land use projections upon which BART was planned a self-fulfilling prophesy.

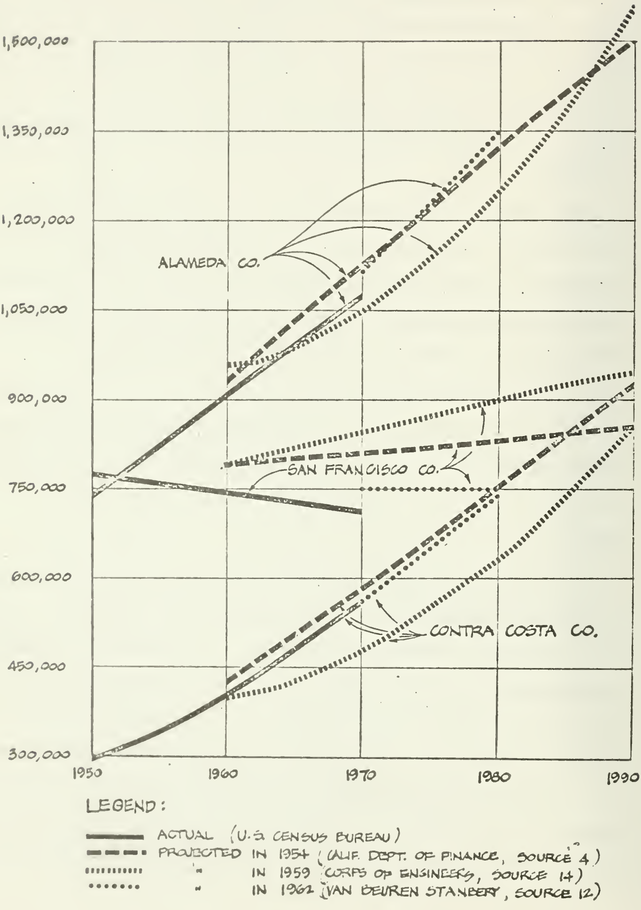
We have assumed, to the contrary, that general growth trends and land use have not been substantially altered by BART but, more importantly, with or without BART, long- and short-term transportation planning would respond to travel demand based upon growth projections contemporary to the planning decisions.

The growth projections of BART's planning years are indicated in Table II-1, along with actual growth. Growth in two of the three BART counties -- Alameda and Contra Costs -- has been extremely consistent with pre-BART projections, despite BART.

In the one county where the pattern of growth did not correspond to pre-BART projections -- San Francisco -- the population actually decreased. While this could be interpreted as a popular anticipation of future commuting ease with BART, it is our opinion that the factors which have influenced the emigration from San Francisco are more realistically related to the nemesis of many of today's cities -- rising housing costs, rising costs for public services (hence increasing taxes), perceptions about social conditions, coupled with declining qualities of service provisions, etc.

TABLE II-1

PROJECTED VERSUS ACTUAL POPULATION GROWTH BY COUNTY



It has been our assumption that the growth considered in planning for a No-BART alternative during the past 20 years, whether based on earlier projections or actual growth, would not have been sufficiently different from what has occured with BART to warrant a reorientation of travel demand origins or destinations for a Generalized No-BART Alternative. While the land use impacts, and hence travel demand, of BART's implementation may actually prove to be greater than our generalized assumption, the detailed analysis required for a determination of BART's impact on land use, as well as loading the network of the GNBA in response to land use analyses are parts of other BART Impact Program tasks. Our assumption relates only to a determination of the Generalized No-BART Alternative.

The transportation demand projections which we have utilized in sizing the potential components have been the Parsons, Brinckerhoff, Hall and Macdonald (PBHM) projections contained in the 1955 "Regional Rapid Transit" report. At that time, the BART Commission's report included the most comprehensive travel demand projections of the Bay Area, and maintained that reputation until the Bay Area Transportation Study (BATS) research was available in the late 1960's. The use of BART statistics for a non-BART scenario are justified insofar as the PBHM projections represent the results of a state-of-the-art effort to determine travel demand in the Bay Area. Without BART the client might have been different. We have no reason to believe the projections would have been different, however.

Transportation developments which might have occurred during the past decade have been judged in terms of the demand forecasts prepared by the Bay Area Transportation Study Commission (BATSC).

C. Major Interest Groups

The decision process both absorbs and responds to major interest group influences. Any attempt to structure a decision environment without reconstructing the position of key interest groups -- groups which are vocal, highly visible, or otherwise influential -- would be remiss.

There are two characteristics of interest groups present in the Bay Area. First, the presence of large numbers of highly articulate and relatively affluent or independent private citizens in San Francisco supplements the normal public reaction to issues by raising ad hoc citizen groups. While these groups relate to major issues, their impetus is normally defensive, attempting to block action rather than promote it. Furthermore, many of the active citizen groups share only a common view on a single issue, and hence lose the cohesiveness necessary for sustained influence as a major interest group. The groups which might have advocated for or reacted against the GNBA components would probably have different in composition from groups which affected BART.

Secondly, the business community, often perceived as the most influential interest group, can often gain a consensus on only the broadest issues. Fortunately, transportation and transit, when neither is considered exclusive, are within the appropriate definition of an issue worthy of attention.

The nature of the transportation planning process also conditions the influence of interest groups. The momentum of transportation planning is sustained by the planning bureaucracies[1], who establish programs and priorities and engineer transportation developments on the basis of technical decisions, largely independent of popular opinion or political climate. The process has been sensitive to interest group reaction at the time of implementation, rather than during the planning stages.[2] Hence, interest groups are defensively oriented rather than proponents of innovative planning. Until the past 5 years, it has been extremely unlikely for transportation developments to originate outside the planning bureaucracies. The likelihood of actual implementation of the transportation developments proposed for the No-BART scenario is reinforced when the planning bureaucracies have considered them, given the origin of most developments.

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[1] "Bureaucracies" is in no way meant as a pejorative term. It merely is meant to describe a large organization which does function according to standard patterns of behavior, frequently isolated by routine or procedures from non-technical input from outside.

[2] This is changing with increasing legislative requirements for citizen participation in the planning process.

Naturally, a prominent exception to this process was BART, which was conceived outside of the normal planning process. Only a comprehensive solution, in the cosmetic of modern technology, would gain the determined support of such an influential group as BART earned. Few interest groups champion incremental change.

1. The Commercial and Industrial Interests: The Bay Area Council

Commercial and industrial interests do not frequently form visible alliances over single issues; rather, their support or opposition, normally homogeneous in nature, is funneled through existing organizations, such as trade associations or the Chamber of Commerce. On a major issue, such as improving transportation in the Bay Area, which affects the economic strength of the region, the commercial and industrial interests will raise nearly a unanimous voice of support. Despite the support, the degree of active public and political advocacy will vary, depending upon the transportation improvements at stake.

The potential influence of a commercial-industrial interest group is apparent from the impact of the Bay Area Council's advocacy of BART. The Bay Area Council was formed in 1945 by Stephen Bechtel, then president of Bechtel Corporation, when he convened the heads of five other Bay Area corporations -- American Trust, Bank of America, Pacific Gas & Electric, Standard Oil of California, and United States Steel -- to discuss the economic future of the Bay Area. Since then, the Bay Area Council has been prominent in addressing seemingly progressive issues and for including some of the region's most influential businessmen and political figures. An early focus of the Council's conversations was development of an effort to unite nine counties of the Bay Area into an integrated, interrelated economic region. Given this focus, there is little doubt that these interested corporate parties would favor increased transportation capacity which related to regional needs. Thus, the Council strongly advocated approval of the Southern Crossing from 1965 through 1970.[1]

The Bay Area Council's successful advocacy of BART, including an instrumental role in the formation of the BART Commission in 1951, has often been associated with an assumed objective of transforming San Francisco (and, to a lesser degree, Oakland) into a centralized, high density, financial and commercial center. To implement this concept, a regional transportation system is necessary due to (a) increasing densities and, therefore, congestion in transportation corridors serving employment centers, and (b) increasing travel distances for more people as population growth forced larger proportions of Bay Area residents into outlying residential areas. The implied threat, of course, was that congestion would prevent an adequate work force from reaching the proposed employment center. The comprehensive solution to this problem was BART.

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[1] Recommendation of Bay Area Council Transportation Committee to BAC Board of Trustees Regarding Southern Crossing, January 16, 1970, and KCBS Editorial Reply by Stanley McCaffrey, President of BAC, February 16, 1970.

In the absence of BART, it is assumed that the Bay Area Council would favor virtually any transportation improvements, particularly those which are part of a regional system. Improvements which fulfill both the role of BART (which embodies the objectives of the Bay Area Council), such as intra-urban transit as well as local urban service, would receive endorsement by this representation of the industrial and commercial interests. The position of the Chambers of Commerce coincides largely with the Council's, although the Council's role of advocacy tends to be more activist than the Chambers'. The Chamber of Commerce, while a forward-looking, socially conscious and civic-oriented organization, is reduced in its capability to act decisively and vocally on transportation issues by the diversity of its membership.

While the Bay Area Council would support almost any transportation improvements, it is unlikely that it would swing its full leverage behind any developments which were less than comprehensive in nature, such as BART or the Southern Crossing.[1] Incremental improvements to existing networks and service are assumed to gain considerably less support.

2. Citizens' Groups Opposing Highway Construction

San Francisco is recognized as the effective national home of the "freeway revolt" which has deterred highway construction over the past 20 years. The anti-freeway interests in San Francisco are discussed here to give a sense of timing to our assumptions concerning public reaction to highway construction, the perceived adverse environmental impacts of highway construction, and the impacts of neighborhood dislocation related to right-of-way location and acquisition.

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[1] The level of support the Bay Area Council is capable of is evident from the Citizens for Rapid Transit, the "citizens' group" which ran the publicity campaign for BART's bond issue. Citizens for Rapid Transit was composed, virtually, of the Bay Area Council leaders with support from eventual BART contractors.

As early as 1956, violent citizen opposition was heard toward a conventional freeway plan for the Western Freeway, subsequently vetoed by the Board of Supervisors. By 1958, the forces opposed to freeways in San Francisco -- forces which received considerable press throughout the Bay Area -- had become even more effective. As a result of strong opposition from neighborhood groups, supported by ad hoc anti-freeway groups, the city-financed "Crosstown Freeway" was abandoned in favor of local improvements in 1958. In the same year, the Board of Supervisors was deluged with petitions and resolutions from groups opposing the proposed Western Freeway, which had been resurrected. This reaction ultimately enlarged itself into a general opposition to freeways. The Board responded on January 23, 1959 with the "Freeway Revolt Resolution" which stated that no freeway agreement would be signed for the construction of Golden Gate, Central, Western, Crosstown, Park Presidio or Mission freeways.

Actions which occurred in San Francisco are reflective of the influence the anti-freeway citizen reaction could bring to bear on transportation decisions, an influence recognized by citizen groups elsewhere. Thus, although the organized opposition to freeways in other BART counties did not reach the level of the San Francisco highway revolt, local political bodies throughout the Bay Area were sensitive to the potential local reaction to highway construction from the 1955 to 1960 period on, and citizens, as groups or individuals, were willing to speak out before City Councils and County Supervisors in order to deter highway construction

Although local input historically has not had much effect on highway planning, local reaction can have a significant effect in delaying or overruling implementation of those plans. Since both the highway plan and the short-range development programs contain more routes and mileage than can be funded, the effect of local opposition can be the delaying of a project and, hence, the shifting of funds to other projects. On the other hand, an anticipation of strong public reaction to highway plans, based on vocal opposition in local government meetings, can cause the Division of Highways to lower a project's priority in favor of actually constructing a route with local support. (This urgency to build highways is more than philosophic. The purchasing power of the Division of Highways is slowly eroding as inflation mightily exceeds the increase in revenues for capital projects even while maintenance costs rise).[1]

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[1] Interview with Joseph Browne, Chief, Transportation Planning, CalTrans, Division of Highways, Region IV, December 11, 1974.

Naturally, one might conjecture that strong local support for certain highway improvements would result in a reordering of priorities in a No-BART scenario, so that highways not constructed during the past 10 years (for reasons of local opposition) might have been built in the absence of BART. Our research into the entire CalTrans programming and financing for Region IV over the past 20 years has indicated that, with one exception, the potential components of the GNBA would not conceivably have been of higher priority than the programmed highways actually constructed. The exception is completion of the Grove-Shafter Freeway in downtown Oakland.

The local pressures which have delayed completion of the Grove-Shafter Freeway represent not an anti-highway bias so much as the impact of civil rights influences. The lawsuit against completion concerns provisions for housing relocations of residents of the acquired right-of-way. BART is not considered an influence on civil rights issues.

The same issue of housing relocation has delayed construction of I-92, by delaying completion of Route 238 through Hayward. Without completion of 238, I-92 is not a rational element of a highway network. The housing relocation lawsuit, again, is not considered an element of opposition which would have been muted by the absence of BART's travel capacity. Housing issues and civil rights emerged independently of the progression of events and influences resulting in BART.

Finally, the completion of Route 4 (John Muir Parkway) is a discretionary link. Travel demand along its route, even prior to BART service, was not adequate to justify either local or state support for its completion.

Other issues which became an anti-highway influence, and is independent of the transportation aspects of BART (hence, unlikely to change in a No-BART scenario), are conservation and environmental concerns. These concerns established a nascent role in the highway revolt of 1958-1959. Throughout the 1960's, the influence of these concerns, particularly in the Bay Area, was becoming increasingly vocal and effective.

The volatility of the highway issue among conservationists became apparent again in 1969, when the San Francisco Bay Conservation and Development Commission (BCDC) granted a permit for construction of the Southern Crossing. Within the month of that action, November, 1969, the number of Bay Area "environmental" groups increased from 90 to 200, preparing the opposition.[1]

In our evaluation of the likelihood of implementation of potential components of the No-BART alternative, we have assumed that anti-highway interests include groups protecting their rights in housing relocation from right-of-way acquisition; citizens opposing the detrimental impact of highways on neighborhood continuity;

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[1] "The Southern Crossing," a case study, Stanford University Graduate School of Business, 1971.

conservationists and environmentalists (Sierra Club); aesthetic or beautification groups (California Roadside Council); and groups which considered highways generators of congestion rather than solutions (California Tomorrow). In the absence of BART, it is unlikely the basic opposition of these groups would change, since none of the philosophic arguments are in travel capacity terms (with the exception of the last, which can be accommodated by non-BART transit). Thus, we have not assumed a reversal on the part of any groups, nor increased support (hence funding priority) for potential components which were not built. The two potential components (Grove-Shafter completion and Hoffman Boulevard) most likely to have been supported in the absence of BART already benefit from high funding and programming priority but cannot be built in one case from a lawsuit and the other insufficient regional funding. Other potential components, such as the Hegenberger Expressway, do not compete with an existing BART route, and thus are not assumed to have lost support from BART competition.

Consequently, we have assumed, on the basis of our research, that local citizens' groups in opposition to highway construction, where evidence of opposition exists (and in the absence of basing opposition on the redundancy of travel capacity with BART), have the same capability to deter or delay highway construction programs -- either through political or legal action -- in the No-BART scenario.

3. Interests in Favor of Highway Construction

The interests which favor highway construction are inherent to the transportation planning process, in which independent funding and an autonomous entity -- the State Highway Commission -- could plan highways in isolation from transit requirements until recent years. The Division of Highways itself, then, provides the strongest and most influential force in favor of highway construction.

Furthermore, despite the proscription of legislative interference in highway decisions, consideraable legislative support of highway policies has emanated from the Senate Committee on Transportation (chaired by Senator Randolph Collier until 1968). This Committee's influence, frequently brought to bear in restricting highway funds from transit purposes, resulted in a Department of Public Works' study recommending a comprehensive statewide freeway system. The California freeway and expressway system was enacted by the legislature in Senate Bill 480 of 1959, known as the Collier Master Plan for Freeways; which provided the blueprint for the region's highways, with or without BART. Notably, this plan was developed prior to BART's implementation.

The legislature and county governments, in turn, are undoubtedly influenced by the support major private interest groups give to highway expansion policies. The lobbies in favor of highway construction in California are no different from elsewhere: truckers, road-builders, highway engineering firms, and various direct beneficiaries of highway construction, such as materials suppliers. While the influence of these lobbies can be substantial, we do not feel they would have had an impact in the developments of a Generalized No-BART Alternative except as their interests are embodied in the funding and planning of highways generally. Thus, we discount the ability of this interest group to determine transportation alternatives independent of the Division of Highways; its support of the highway program has not yielded adequate funding for many highway segments in the Bay Area, not has its support of the Southern Crossing been sufficient for success.

Local highway construction proponents are equally unlikely to have been able to influence the allocation of highway funds or ordering of priorities in the Bay Area. Legislative restrictions determine the total share of highway funds which are allocated to Northern California. Furthermore, the state's highway budget is allocated according to a formula in which each county is guaranteed a certain amount of state highway construction expenditures during specified periods based upon percentages established in the law. This requirement prevents significant shifts in construction priorities regionally, although highway priorities can change within a county without being affected by this restriction.[1]

The influence of pro-highway interests, then, is not considered instrumental in the development of the Generalized No-BART Alternative, except as it is represented by the financing and planning of highways as legislated. The most effective proponent

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[1] Interview with Joseph Browne, op.cit.

of highway construction, and one which our research indicates did not feel itself influenced by BART either in its planning or financing, is the Division of Highways. We assume that the Division of Highways has acted in its own interest throughout BART's implementation (while cooperating with BART on joint rights-of-way) and thus would not act appreciably different in a No-BART scenario. Furthermore, in the context of the entire Region IV program, our research has uncovered no evidence to indicate that the individual priorities for highways within the region would have shifted in order to finance highway segments in the BART counties with funding spent on highway improvements in non-BART counties over the past 20 years. It is our assumption that additional forces in support of highway construction, in addition to the influence brought to bear with BART, would not have occurred.

4. Interest Groups in Favor of Transit

The major interests supporting private transit, similar to proponents of highway construction, are the bureaucracies and private firms which plan and operate transit service. This, of course, is a natural inclination. Genuine public support for transit which was less comprehensive and glamorous in nature than BART, however, did not surface until after 1965.

The industrial and commercial interests have always favored improved transportation; and, insofar as improved local and interurban transit increases the mobility of the work force and expands the base of employment, these interests would favor it. That support is assumed to have extended over the entire 20-year period of the No-BART scenario. As mentioned earlier, the level of this support, and its active advocacy, would vary depending on the comprehensiveness and the magnitude of the proposed solution. In the No-BART scenario, these interests are assumed to support -- passively -- bus transit improvements, at least until the late 1960's when the vogue had changed on "appropriate" transit solutions and their support might safely shift to bus transit.

In the 1950's, and even the early 1960's, buses had developed an image of being dirty, uncomfortable, obsolete vehicles fit only to serve either those who couldn't afford automobiles or rural school children. A regional, interurban bus transit system of sufficient magnitude to eliminate congestion and divert travelers from automobile use to transit use would have been hard to justify, either in terms of public salability or technical terms, until the late 1960's.

The current popular search for the flexible, "low capital intensive" system -- with its paradoxical preference for buses and reserved sections of highway pavement as components of an advanced, "creative" solution -- had generally not developed by 1965. But, by the end of the 1960's, the simple transit solution -- modern and comfortable buses, assisted by express lanes or priorities at points of congestion -- became fashionable in response to two factors: (a) a growing awareness that the capital expense of fixed rail systems would be much greater than the resources that likely would be politically available to pay for them, particularly in light of the wearying expenses of the Vietnam war and the concomitant inflation, and (b) a shift in socio-political philosophy from enchantment with big government and "big" urban program solutions to an "urban population" characterized by "neighborhoodism," decentralized de facto political structures in the cities, and popularly forced shifts in the emphasis of government programs from things like massive urban renewal to neighborhood rehabilitation. Macro-solutions fell into disrepute during the first half of the 1960's. Transportation was affected no less than other systems approaches to services or social programs. Thus, by the late 1960's, the rhetoric of transportation planning and interest group advocates had returned to buses as "flexible and demand responsive."

Thus, in the period 1965 to 1975, support for bus transit solutions could be expected from Chambers of Commerce, business associations in San Francisco and Oakland, and planning-oriented groups such as San Francisco Planning and Urban Renewal (SPUR). The practically unanimous support given the Golden Gate Bridge, Highway and Transportation District in its development of a bus transit system for Marin and the Golden Gate Corridor in 1971 provides a confirmation of the available support for this solution by that time among urban populations and interurban commuters.

The City and County of San Francisco, as well as Alameda County, could be expected to support transit, much as they have supported BART. In fact, it can be assumed that officials and state legislators of these jurisdictions might provide less divisive support for transit improvements which were, indeed, more demand responsive and flexible.

Passive support for transit also is assumed from neighborhood associations and citizens' groups involved in the "freeway revolt," understanding that increased transit capacity reduces the demand for increased freeway and highway capacity. Additionally, the public support in Alameda and Contra Costa Counties for A.C. Transit since 1956 reflects a willingness to support transit; without BART and its additional transit taxing, it is unlikely support for A.C. Transit service would have decreased.

Finally, the press can be expected to have supported even a non-BART transit system. In fact, the "inept management" which the San Francisco Chronicle used as the basis for its villification of BART, after initial support, might not have provided the high visibility for negative reporting with a bus technology solution. Today, the press is favorable to both transit generally and bus transit in particular, for the obvious attributes of low capital intensity and flexibility. National trends and attitudes would have provided impetus for this support even if some negative reactio to BART had not.

D. Financing

The financing of a transportation system is a major element of system implementation, and the mechanisms for financing often rank among the most imaginative innovations of transportation developments. The GNBA assumptions concerning the availability of funds from various sources which were used or considered in financing BART in many respects govern the form of the GNBA.

The purpose of this section is to document our assumptions on the availability of funds from federal, state, and local sources. The implications of each of these financing assumptions on the likelihood of implementation of GNBA components are developed in the discussions of each component in sections II and III.

1. Federal Funds

BART received $298 million of federal support through April, 1974. Naturally, the question arises whether, and how much of, this money might have been available for implementation of the No-BART alternative. In this section, we treat the assumed availability of each potential federal source of revenue individually.

a. Highway Funds

The level of federal highway funds available to the San Francisco Bay Area in the absence of BART would have been equivalent to the amount actually spent -- $799.05 million in the BART counties (1955 to 1974) or $1,687.16 million in the nine-county Bay Area during the same period.

There are sound premises for this static assumption: the value of funds available for both interstate and non-interstate federally aided highways during the past decade (1965 to 1975) has been constrained, particularly in light of the reduced purchasing power of the highway construction dollar, the still incomplete segments of committed networks, and the rising maintenance expense of ever-increasing mileage.

i. Interstate Highway Funds

The amount of interstate highway funding available, nationwide, is limited each year. Each state receives a share of available funds equivalent to the portion of the committed national interstate system in that state which remains incomplete. In California, the portions which are incomplete in the state essentially compete for the state's allocation. While a priority but incomplete portion of the system may receive a commitment of funds earlier than another incomplete segment, it is unusual for the priorities, hence the sequencing of funds' availability, to change.[1] It is not likely, in the absence of BART, that public pressure in the Bay Area for the alleviation of congestion would have resulted in sufficient political influence to wrest an increased portion of Interstate Highway funds from either the state or the federal distributors.[2]

It is also unreasonable to assume that highway improvements not presently considered part of the Interstate Highway system might have been programmed into that system, thus becoming available for federal funding and increasing the leverage of the Bay Area for a greater share of the federally allocated funds. Insofar as the entire system has a mandated completion date, and in view of the escalating costs of construction and right-of-way acquisition, the established priority has been system completion as programmed in the original legislation in the 1950's. According to CalTrans and the Toll Bridge Administration, it would be unrealistic to assume the Federal Highway Administration would permit the designation of an alternate bay crossing as an interstate highway link, opening a source of funds for the Southern Crossing. The preoccupation of the authorities is with completion of the network as planned. Interstate designation of the Southern Crossing would also require changes in the network to connect approaches with existing interstate routes. Our research and interviews have established this possibility as unrealistic and unlikely.

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[1] The exception to this rule occurred when the Federal Bureau of Public Roads, recognizing the earnestness of San Francisco's repeated vetoes of highway improvements within the City, reallocated funds initially programmed for San Francisco freeways to the Century Freeway in Los Angeles.

[2] Ibid.

ii. Federal Aid to Highways (Non-Interstate)

Federal aid to non-interstate highway networks also is assumed equivalent to historical levels under the No-BART scenario. All federal highway funding allocated to the Bay Area during the past 20 years has been spent. Incomplete highways, or programmed highways which have not been built, are not a reflection of anticipation of reduced travel demand due to BART so much as optimistic programming in the context of financial resources growing at a rate less than anticipated. (Hoffman Boulevard improvements provide just one example.) During the 1950's, the highway-related revenues were projected at a formidable rate, and the absence of any anticipated financial constraints created a planning and programming euphoria among at least the state highway planners who were planning with an expectation of a high level of available federal funds. The result has been a programming of priority construction which cannot possibly be met with available resources.

Our assumption for a No-BART scenario is that the level of this funding would have remained the same as historical levels. Thus, we have assumed, with the corroboration of interviews with the Division of Highways, that insufficient funding was available to meet the highest priority construction; the point of shifting priorities among discretionary improvements was never reached. Furthermore, the amount of priority shifting on expenditures, even in this category of federal funding, is limited by statutory requirements to satisfy specific proportional allocations of all funds to each county and highway district in each 4-year period.

b. Mass Transit (Capital and Demonstration Grants)

In the decade since passage of the Urban Mass Transportation Act of 1964, BART has received $298 million in capital grants and the non-BART transit operators of the BART service area (A.C. Transit and Muni) have received $96.3 million. Clearly, evaluating the sources of revenue available for transit agencies in a No-BART scenario requires consideration of the availability of federal mass transit support of this magnitude. The evident question focuses on whether the operating agencies of the Bay Area would have received as much federal support without the attention BART brought to the Bay Area, whether there would have been no impact on the monies they received, or whether those agencies would have received a greater share of federal funds in the absence of BART's absorption of funds.

BART's impact on the timing and quantities of federal funding for mass transit is one of the more dramatic impetuses for transit implementation which will be missing in the No-BART scenario. The public relations efforts promoting BART during the period 1960-1962 were carried as far as Washington; it resulted in considerable enthusiasm toward national support of advanced technology rapid transit solutions. After 1962, the message of BART as a necessary urban service was persuasively conveyed to the congressional committees responsible for urban problems by BART's General Manager, B. R. Stokes, the Board's President Adrian Falk, and by five members of California's Congressional delegation who, together, presented the case for federal support of mass (or rapid mass) transit. Without this publicity, and the advocacy efforts of this representation, the narrow victory of the Urban Mass Transportation Act of 1964 in the House of Representatives would undoubtedly have been unlikely, according to responsible federa officials involved in the effort. As a result, we have assumed mass transit assistance for capital and demonstration grants would not have become available until the 1965-1970 period, perhaps not until as late as 1968, in a No-BART scenario.[1]

Given the small amount of initial support to non-BART transportation operations under the 1964 Act prior to 1970, we have assumed that, even with delayed enactment of that Act, the amount of federal support to the non-BART transit agencies of the Bay Area would have been equivalent to the amount the non-BART agencies actually received.

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[1] Interview with John Kohl, former Assistant Administrator for Transportation, Housing and Home Finance Administration (HHFA), 1961-1966. Mr. Kohl was the federal official responsible for administering the first federal funds for mass transit assistance.

It has been suggested that the non-BART transportation systems might have received less federal support because either (a) the visibility of the Bay Area's regional transportation requirements would have been diminished without BART's Washington advocacy, or (b) other agencies would hesitate to request funds of the magnitude they did without BART's example of grant levels. Neither has proven a convincing argument. A strong advocacy effort for federal support could be expected to yield capital grants, whether the system is a BART-like system or not (e.g., the Golden Gate Bridge, Highway and Transportation District's success in gaining federal capital grant support). This assumption is supported by the existence, until recently, of available UMTA funds for which insufficient applications have been received.

The assumption on capital grants availability for non-BART transit operations is that funds equivalent to those actually accrued by non-BART agencies in the Bay Area through 1975 would have been available, although disbursement would have occurred between 1970-1975. Even under the 1964 Act, BART was the only Bay Area recipient of funds until 1969 when A.C. Transit received approximately $1 million. Without BART, however, the disproportionate share of federal transit capital funding allocated to the Bay Area would not have occurred.

c. Mass Transit (Operating Subsidies)

Despite the perennial case for operating subsidies brought to Washington by the nation's transit operators, implementation of a federal program had to await, at the least, the emphasis placed on transit by the energy crisis. No compelling argument could be found to indicate the course of political events could have been changed in the absence of BART, unless passage were actually delayed by the absence of BART's financial concerns. The latter, however, is not considered a realistic assumption; the slow evolution of political acceptance of an overdue concept was inevitable.

Although our assumption accepts implementation of the National Mass Transportation Assistance Act of 1974, which includes operating subsidies, our assessment of potential revenues for GNBA implementation do not include federal operating subsidies. Until the guidelines and regulations for subsidy distribution are disseminated, relevant consideration of the impact of this source of funds during 1975 would be merely conjectural.

2. State Funds

a. Highway Funds

As in the case of federal highway-related funds, no increase in the amount of available state highway-related funds for the Bay Area has been assumed.[1] Projected revenues, upon which highway programming was based, has been proven unduly optimistic; on the other hand, the cost of construction has diminished the value of even the committed construction dollar. Furthermore, all allowable funds for state highways have been committed during the past two decades. Finally, Governor Reagan's administration, with its record of fiscal conservativeness, would have been unlikely to increase the taxes necessary for augmenting highway funds.

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[1] Interview with Joseph Browne, op.cit.

b. Highway Funds Diverted to Transit

The protection of highway funds from transit use has been effected through the years by a committed highway bureaucracy and lobby. Despite the highly publicized financial requirements of BART, and the improving public image of mass transit and its necessity in the early 1970's, it was not until 1974 -- with the passage of Proposition 5 on the November ballot -- that highway-related funds *per se* were diverted to transit uses. In 1971, S.B. 325, the Transportation Development Act, provided the first state assistance available for transit purposes, but not through the diversion of revenue sources previously dedicated to highway finance.

Given the opposition of Senator Randolph Collier, the chairman of the Senate Transportation Committee, and the persuasion of the highway lobby, the likelihood of any earlier legislative actions making highway-related funds available is small.

For purposes of the GNBA evaluation, it is assumed that the absence of BART would not have affected the availability of state highway funds for transit purposes. In fact, there is a possibility that passage of S.B. 325 would have been delayed without the high visibility of BART's financial crisis; nonetheless, we have assumed that the emerging public interest in transit, statewide, would have been adequate (with the support of non-BART transit operators) to assure passage of S.B. 325 in 1971 and that the fuel crisis would have provided the impetus for Proposition 5's passage in November, 1974 in a GNBA scenario. Even BART, in its search for funds in the late 1960's, did not actively consider the viability of amending the constitution to access highway funds.

An alternative highway-related source of funds sought intermittently by BART was an increase in the in-lieu (auto property) tax. Because of the political opposition to this approach, particularly evident during the 1967-1969 attempts to seek funding for BART, it is not considered a viable element of GNBA financing. At that time, a number of Bay Area legislators opposed it, including Assemblyman Robert Crown (Democrat of Alameda), the influential chairman of the Assembly Ways and Means Committee.

Legislation to divert or increase auto license fees was repeatedly defeated in the late 1960's. Organizations which attacked this proposal in 1968, all influential, included the State Chamber of Commerce, the California AAA, the Automobile Club of Southern California, the Motor Car Dealers Association, and the Highway

Users Conference. There is no evidence that a different form of transit, such as bus, would reverse the opposition of the motorists' associations to the diversion of auto license fees to transit.

A similar concern prevented transit funding from increased bridge tolls. This prospect was considered in the Legislature several times in the late 1960's; inevitably there was opposition from many disturbed with the funding of transit operations through a toll on motorists. This philosophic bent was strongly held by legislators and interests in the highway lobby. From 1966 to 1974, it was not likely that transit operating support would come from this source because of the strong conviction Governor Reagan held opposing this approach. Governor Reagan also opposed any revenue bonds which might be issued by the Toll Bridge Authority in support of transit for fear it would reduce the Authority's capability to finance the Southern Crossing.[1] Finally, some question was raised concerning the Toll Bridge Authority's ability to finance transit through toll revenue without raising tolls, particularly because of the bond covenants existing from earlier financing which called for repayment of bridge debt as the committed use of revenue. This diversion of funds to either transit capital expenses or operations may not have been allowable prior to full retirement of the Bay Bridge bonds.[2]

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[1] San Francisco Chronicle, March 7, 1968.

[2] Interview with Jerry Hawken, Senior Engineer, Toll Bridge Authority, December 13, 1974.

The basic assumption concerning diversion of highway-related revenues to transit acknowledges the lack of public interest in transit from 1955 to 1965. The subsequent five years, particularly in the Bay Area, reflected a reassessment of the available funding sources. Nonetheless, during 1965-1970, the highway orientation of decision-makers remained sufficiently cohesive to forestall any diversion of highway funds. This position was reinforced by the Governor, who effectively eliminated the option of highway fund diversion, particularly after 1968, when a rapid transit proposal for Los Angeles was defeated at the polls, reducing Southern California support for rapid transit financing by the state.

Nonetheless, the changing public attitudes during the period 1970-1975 and, ultimately, the fuel crisis would have opened up state financing alternatives for transit during the period 1970-1975 but certainly no earlier than actually occurred.

3. Sales Tax

Increases in the sales tax have always been a politically difficult source of financing because of their visibility. While an increase in the sales tax eventually was legislated for the three BART counties to assist BART, it was opposed by the Bay Area legislators up to its implementation. It was accepted because it was the only alternative to the highway-related revenues the Governor found unacceptable.

Sales tax increases, however, are rarely palatable to local politicians. In the case of the BART support, a poll taken in Feburary, 1969, two months prior to the increase, indicated only 34% of the population favored the sales tax increase (53% favored the bridge toll increase).[1] Fortunately for BART, the sales tax increase can be implemented with a vote of the Board of Supervisors (once legislative authorization is received) without going to the voters. There appears to have been little sentiment toward using a sales tax increase to support transit generally (other than BART); the express financial problems of BART resulted in a local tax, but no support for other transit modes.

In the absence of the financial crisis and political and public leverage associated with BART, it is highly unlikely the sales tax, regionally or statewide, would have been increased to provide transit assistance.

4. Property Tax

a. Transit

The property tax or a municipal general fund, supported largely by property taxes, has been the historical support for mass transit operations, both in operating subsidies and capital funding. It was the basis for BART's $792 million bond issue. It will remain a primary source of subsidy for transportation.

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[1] "Urban Transportation Decision Making, San Francisco," by Frank C. Colcord, Jr., Massachusetts Institute of Technology, May, 1971.

In evaluating the willingness of the taxpayer to subsidize a GNBA through the property tax, it is appropriate to review the public response to financing bus system improvements through this financing device. (Despite the success of the BART bond issue, there is considerable professional skepticism that a bus-technology system would have provided sufficient popular appeal as a solution to congestion to gain bonding support in 1962.[1])

The BART and non-BART counties in the Bay Area have sought voter approval for bus transit improvements on numerous occasions during the past 20 years, providing some measure of public acceptability (conditioned, naturally, by the BART-related tax bill in the BART counties). A.C. Transit failed in its first attempt to gain a bond issue in 1958; in 1959, however, the voters approved a $16.5 million bond issue for equipment purchase (the approval requirement was lowered from two-thirds to 60% in the interim). On the other hand, BART failed to gain 60% support for its system in either Alameda or Contra Costa counties in 1962. Thus, the assumption we have pursued is premised on public reluctance to fund transit improvements, particularly any bus transit service above and beyond that provided by A.C. Transit, which met the public's travel demand in the Transbay Corridor. Greater service levels, hence capital expenses, would not be necessary in the GNBA; on the other hand, the A.C. Transit District electorate was willing to bear the costs of the 1973 system and would do likewise in the GNBA.

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[1] Interview with Henry Alexander, public relations consultant to Citizens for Rapid Transit on the BART bond issue.

In San Francisco, although the marketing of a high technology system such as BART was able to gain nearly 67% approval in a bond election in 1962, the voters have demonstrated their lack of interest in a bond issue to rejuvenate Muni. Muni has not had a successful bond issue since 1947; the most recent defeat occurred in November, 1966. This lack of public support is assumed to be symptomatic of the low priority or lack of confidence Muni earns in the electorate's esteem.

Muni improvements have been slow in coming. While it is possible to suggest that the public interest in funding transit improvements -- in the absence of BART's bond issue -- might have been greater, the Muni management has not had a reputation or history for strong programming. The improvements which are presently planned in many respects relate to the impetus of the BART tunneling of Market Street, even to the selection and purchase of the new articulated cars. The system's structural improvements, so badly needed, could not gain funding authority prior to, not subsequent to, BART's bond issue. Thus, we have assumed neither the internal management programming nor the bonding authority would result in major extensions of Muni prior to 1975 in the GNBA. The necessary structural changes and maintenance, and the local share of federal funding for capital equipment purchases to maintain service levels or increase them (without expanding service), would be funded by the Muni Improvement Corporation, a non-profit corporation guaranteed by the city property tax.

The property tax, then, remains the basic source of financial support for transit systems. Without unorthodox systems, the level of support would also remain conventional. The willingness of the electorate to support increased bus transit expenses would not be unlike the history of the past two decades, when investment decisions in bus systems provided the only means for covering travel demand. This is particularly relevant in light of the non-competitive roles the local/feeder service of both A.C. Transit and Muni play with BART.

The tax base for the property tax support of each system would also relate to today's political jurisdictions.

In the non-BART counties, the electorate has also hesitated in supporting bus transit operations through taxing and bonding authority. In Santa Clara County, the transit district formed in June, 1972 still lacks taxing power, although a proposition to grant it those powers will be on the ballot in March, 1975. In San Mateo, support for transit (in addition to Southern Pacific service) was only recently approved, in November, 1974, with the establishment of a transit district.

b. Highway Bonds

Since funding contraints have been instrumental in narrowing the scope of the potential highway improvements contained in the GNBA, any innovative source of funds for highway construction which might have been utilized in the absense of BART could have an impact on the GNBA.

Santa Clara County provided a recent example of the use of property tax for highway improvements when it went to the voters to authorize a $70 million expressway bond issue in March, 1961. This use of the bonding capacity of the property tax is unusual, although not unprecedented in the Bay Area.

Two BART counties where highway travel demand would warrant the construction or completion of additional road miles, and which were stymied for lack of funding, are Contra Costa and Alameda counties. Either county might have sought a highway bond issue in support of county highway improvements, particularly in the absense of BART's tax vote. Contra Costa County, in fact, had gone to the voters twice for such an issue, in 1919 and 1952. Since 1952, when a $16 million bond issue was passed, a county highway bond issue has never been seriously initiated or considered. The County Department of Public Works considered the public attitude toward road construction, since the last bond issue, had deterioriated and would not favor a bond issue, quite independently of BART.[1]

Similarly, in Alameda County, no bond issue for county road improvements has ever been considered or proposed, by the Department of Public Works during the past two decades.[2] Even if a highway bond issue had been proposed, in a county with perceived highway congestion and no BART tax bill, the public acceptance of such a measure in Santa Clara can be countered with the failure of the proposed highway bond issue in San Mateo.

The political salability of a highway bond issue aside, the relative impact the monies could have on the GNBA network is still quentionable. Except in a comprehensive network of improvements such as the freeways funded by Santa Clara in 1961, however, county road improvements would not provide a BART alternative in terms of travel capacity. State and federal highways provide the trunk capacity relevant to covering BART's corridor travel capacity, yet county bond issue monies would not be used for completing unfinished segments of those networks.

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[1] Interview with Mark Kermit, Deputy Director, Department of Public Works, Contra Costa County.

[2] Interview with Ed Meyer, Asst. Director of Public Works, Alameda County.

III. THE GENERALIZED NO-BART ALTERNATIVE

The Generalized No-BART Alternative (GNBA), as a system of transportation developments, has emerged from evaluating the potential GNBA subsystems in the context of the political and financial scenario defined by our policy assumptions developed in the previous section.

While the potential components can be described in technical terms, the reasons individual components have been included or excluded from the GNBA are based principally on an application of the political and financial environment at the time of likely implementation, a subjective judgment dependent upon our policy assumptions of the historical decision environment.

The potential components of the GNBA which were considered are summarized in Table III-1. Each of these transportation subsystems was defined in detail and deemed technically feasible. The technical definition, at this early point in the BART Impact Program, was limited to the following general characteristics:

- General function
- The degree of actual planning conducted
- Physical description, including size, capacity, and location
- Likely authority or agency for implementation
- Likely period of implementation
- Order-of-magnitude costs[1]

The physical location of these potential components is illustrated in Figure III-1.

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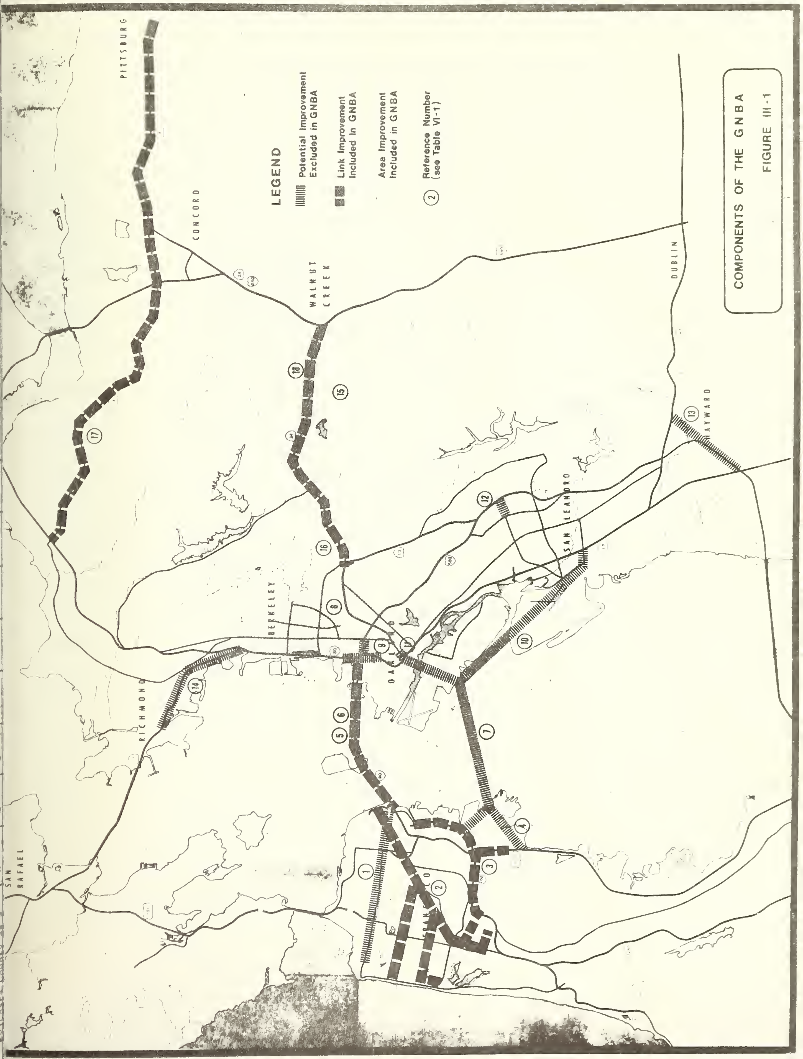
[1] All costs have been inflated to year of likely implementation at an assumed 1970-1975 inflation rate of 10% per annum.

TABLE III-1

SUMMARY CHARACTERISTICS OF POTENTIAL GNBA COMPONENTS

GNBA Component	Corridor(s) Served	Transportation Function	Mode or Technology	Extent or Size	Implementation Authority	Period of Implementation	Order-of-Magnitude Costs (Million $)						Resource Availability					
							Capital Cost			Annual Operating Cost[1]			Federal			State		Local
							1960-1965	1965-1970	1970-1975	1960-1965	1965-1970	1970-1975	Transit Funds	Highway Funds	Interstate Highway Funds	TBA[2]	TDA[3]	Proper T.
1 Construction of Geary St. Rail Transit Line	San Francisco	Subregional	Light Rail	6.5 miles	Muni	1970-75	Excluded from GNBA											
2 General Upgrading of Muni Transit System	San Francisco	Subregional, Local	Bus, Trolley, Streetcar	--	Muni	1965-75			51.0			Not Estimated	x				x	x
3 Preferential Bus Lanes on S.F. Freeways	San Francisco	Subregional	Bus Operational	7.0 miles	Muni CalTrans	1970-75			0.4			0.6		x			x	
4 Construction of Hunters Point Freeway	San Francisco Transbay	Regional	Highway	3.3 miles	CalTrans	Beyond 1975	Excluded from GNBA											
5 Increased Transbay Bus Service	Transbay	Regional	Bus	33% Increase	A.C. Transit	1960-75			4.5			3.5	x				x	x
6 Bay Bridge Preferential Bus/Car Pool Lanes	Transbay	Regional	Bus Operational	On Bridge Approaches	A.C. Transit, DBTC[4]				--[5]			--[5]		x		x	x	
7 Southern Crossing w/ Transit Right-of-Way	Transbay	Regional	Highway, Transit	6.0 miles	CalTrans (DBTC)[4]	Beyond 1980	Excluded from GNBA											
8 Increased East Bay Express Bus Service	East Bay	Regional Subregional	Bus	33% Increase	A.C. Transit	1960-75			0.7			0.5	x				x	x
9 Preferential Bus Lanes on East Bay Arterials & Fwys.	East Bay	Regional Subregional	Bus Operational	--	A.C. Transit, Cities, CalTrans	1970-75	Excluded from GNBA											
10 Bridge Approaches to Southern Crossing	East Bay Transbay	Regional	Highway	10.5 miles	CalTrans (DBTC)[4]		Excluded from GNBA											
11 Completion of Grove-Shafter Freeway	East Bay Transbay	Regional	Highway	0.7 miles	CalTrans	Beyond 1975	Excluded from GNBA											
12 Hegenberger/73rd Avenue Expressway	East Bay	Subregional	Highway	4.3 miles	City of Oakland	Beyond 1980	MacArthur Blvd. to I-580 Segment Excluded from GNBA											
13 Extension of Route 92 to I-580	East Bay	Regional	Highway	4.8 miles	CalTrans	Beyond 1980	Excluded from GNBA											
14 Hoffman (Route 17) Expressway	East Bay	Regional Subregional	Highway	3.0 miles	CalTrans	Beyond 1980	Excluded from GNBA											
15 Increased Regional Bus Service	Berkeley Hills, Contra Costa Co.	Regional	Bus	6 mil. bus miles in 1975	Greyhound, A.C. Transit	1960-75			18.0			7.0	x				x	x
16 Preferential Bus Lanes Through Caldecott Tunnel	Berkeley Hills	Regional	Bus Operational	On Bridge Approach	A.C. Transit, CalTrans	1970-75			0.4			0.5		x			x	
17 Completion of Rte. 4 (John Muir Freeway)	Contra Costa Co.	Regional	Highway	23.0 miles	CalTrans	1970-75			25.0					x				
18 Route 24 in Contra [illegible]	Contra	Regional	Highway	9.0	CalTrans	1965-70			(32.0)					(x)				

FIGURE III-1
PHYSICAL LOCATION OF POTENTIAL COMPONENTS OF GNBA



The only limiting technical criteria of the BART Impact Program were that the No-BART alternative be an operating system, in place, by Fiscal Year 1976 and that it not be a BART-like, or regional rail, system. As in the non-BART counties we reviewed, the GNBA provides no deviations from the highway orientation which prevailed from 1955-1970, constrained only by funds. Transportation planning continued to sustain this conventional trend as it has throughout the country. Further, the bus transit renaissance of the 1970's is also evident, reflecting a shift in public attitude toward transit as environmental concerns and fuel shortages enlivened the image and need of mass transit.

This enthusiasm for mass transit, rather than rapid rail transit, is a result of the short planning horizon of most transit planners and the search for an incremental solution to transportation problems, i.e., one which can accommodate demand in increments, as needed, without an inflexible comprehensive system which would require a long period of implementation and massive funding. As a result of the short planning horizon within conventional transit agencies, the need for a rapid solution to public pressures, and the low cost of bus transit (particularly in the absence of right-of-way acquisition costs), the alternatives to bus transit (or conventional trollies) were limited.

The GNBA, however, consists of more than the hypothesis of a transportation system; it also evaluates the likely institutions to provide transportation services and the contemporary financial resources likely to have been available for transportation purposes in the No-BART scenario. Our evaluation of the most likely institutional alternatives to the Bay Area Rapid Transit District was based on the discussion of alternatives contained in Appendix A. Each potential institutional alternative, and the likely transit financing methods associated with the institutional alternative, were then assessed in the context of the policy assumptions of the No-BART scenario.

Without the introduction of a functionally unconventional mode of transit, in the absence of BART, there is little political or institutional motivation to create additions to the existing transportation infrastructure of responsible agencies. The incremental nature of the hypothesized system permits viable accommodation within the framework of regional transit and transportation districts, the Toll Bridge Authority, municipal transportation agencies, the Division of Highways, and a regional transportation commission. Increased transit capacity through bus technology, rather than rapid rail, is within the mandate and functional capabilities of agencies and political entities which exist today and fulfilled BART's regional transit role throughout the period of BART's implementation.

The institutional alternative to BART, then, is nearly represented by today's institutional and political environment, eliminating a rapid transit district. In other words, Bay Area transportation functions, including BART's, would be assumed by a regional planning agency (MTC), a regional operating agency for East Bay interurban transit (represented by A.C. Transit whose political jurisdiction even today is nearly coterminous with BART's East Bay jurisdiction), and sub-regional operating agencies for local transit (Golden Gate bus and ferry transit, Muni, Santa Clara Transit, and San Mateo Transit).

Clearly, this institutional dimension of the Generalized No-BART Alternative depends upon the assumption that only a dramatic new system, such as the technologically advanced BART system, could gain the voters' support for institutional change or new sources of financing. Public attitude toward interurban or transbay service provided by A.C. Transit, prior to BART revenue service, was extremely favorable. A.C. Transit was lauded by the public and the industry as an efficient and effective transit operation. In the favorable public comment toward A.C. Transit, there was little sense of resignation toward A.C. Transit's performance being adequate given its role as merely providing interim transbay service prior to BART. In fact, legislative hearings and the press have repeatedly compared BART with A.C. Transit, relating not only the cost differential between the two systems, but questioning whether BART could provide comparable service. A.C. Transit would have been capable and willing to continue its relatively lucrative transbay service in the absence of BART; it may even have expanded the service levels without the specter of terminating service with BART's commencement of transbay service.

Since A.C. Transit was capable of providing acceptable service to the existing travel demand prior to BART and recent surveys indicate that BART's transbay patronage is composed largely of the former bus patronage (only 5% fewer automobiles are crossing the Bay Bridge during commute hours since BART's transbay service began), it is reasonable to assume that a No-BART scenario would find transbay travel demand adequately covered by publicly acceptable bus service.

Public dissatisfaction with transit service during the past ten years has more frequently focused on local urban transit needs, the feeder service BART does not provide anyway. These dissatisfactions could have been expected in a No-BART scenario as well, since the anticipation of BART did not influence expectations of this service except in relatively few urban areas served by the linear BART system with short station separations.

Given the relatively muted dissatisfaction with regional transit service (primarily A.C. Transit transbay service), there would be little impetus for the creation of an additional political entity with a regional transit function. Support for this assumption is evident in the difficulty non-BART counties have had in creating a public transit district even for the provision of bus transit services.[1] The implications are that A.C. Transit -- in the absence of either need or external impetus -- would assume the responsibility for transbay service from the East Bay. Insofar as the taxpayers of that district were willing to accept the cost of providing adequate interim transbay service in addition to the cost of BART, it would seem somewhat implausible for them not to provide the same support in the absence of BART. It is even conceivable that the taxpayers would accept an increase in the District's tax rate to support improved service in lieu of BART and its tax rate.

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[1] See "Decision History of Bay Area Rapid Transit," McDonald & Smart, for the BART Impact Program, 1975.

The greatest pressures and dissatisfaction would continue to relate to the local provision of transportation. Muni would continue to face criticism for inadequate service. The financial component of the No-BART scenario, however, assumes that the resources applied to BART would not be applied to its alternative except marginally. In other words, an incremental increase in tax rates might have been acceptable to taxpayers, but a $792 million bond issue would be acceptable only for the glamour of the BART system. In other words, exogenous sources of support, such as federal levels and state levels of support, would still be available for non-BART activities. In some cases, as we documented in our first section, it is assumed that BART would have had an impact on the phasing of these exogenous funds (e.g., the likely delay of federal support for transit capital costs).

While few consider that the federal funding which went to BART would have accrued to other transit agencies in the Bay Area in BART's absence, some feel that the other Bay Area agencies might not have received as much support without BART's presence. This field of thought presumes that BART brought federal attention to the needs of the Bay Area and the potential for an integrated system. Our research has not revealed compelling evidence for this argument; thus, we have assumed that, in the No-BART scenario, aggressive grant advocacy efforts would have yielded federal and state support up to the amounts received to date.

There is only one case in which it would appear that BART's absence would permit a greater distribution of funds to existing operating agencies, and that example is the California Transportation Development Act monies (S.B. 325). This source of funds has provided $23 million to BART which otherwise would have been distributed to the No-BART alternative from 1971 to 1974, presumably to A. C. Transit and Muni. Financing of transit through municipal general funds or district property taxes would be acceptable in support of ongoing operations; however, the experience in non-BART counties and in BART counties as well reflects a reluctance on the part of the voters to finance significant capital improvements to bus-related transit operations during the past decade.

The financing of the No-BART alternative would not occur in a dramatic fashion; rather, it would follow the conventional means (and magnitudes) that other metropolitan areas have used. The taxpayer has shown no proclivity to finance transportation improvements during the period 1960-1970. The notable exception, of course, was BART, which was presented subsequent to conditioning the population, as a technologically sophisticated deus ex machina. Considering the nature of the No-BART alternative (largely highway improvements and increased bus service), neither subtantial funding is required nor is it likely the public would accept an unusual source of financing.

Financing does not provide the impetus for transit improvements, however; the instigator or innovator does. UMTA capital grants, during the early 1970's, awaited meritorious applications. BART, on the other hand, sold a $1 billion system to the public unwilling to support significantly smaller requests for local financing of local service. Hence, funding has not been considered a constraint to transit improvements in the No-BART alternative, once the viability of only an incremental system is established. On the other hand, where additional funding is available, it is assumed the incremental system would spend those funds for service improvements, not to change the basic nature or mode of the No-BART alternative transportation system.

Considering the policy assumptions on interest groups, planning bureaucracies, and funding sources contained in the previous section, the following subsystems have been defined as elements of a No-BART alternative transit system in the BART counties.

Appendix D contains the bibliography of transportation planning documents which relate to the following components.

A. General Upgrading of Muni Transit System and Service

1. General Function

The purpose of this alternative would be to provide improved Muni bus and streetcar service and to increase Muni capacity to a level approximately equivalent to the current combined level of local BART patronage and Muni patronage.

2. Degree of Actual Planning Conducted

During the last 10 to 15 years, improvement of Muni service and equipment has not received appropriate attention. Perhaps a partial reason for this can be found in the fact that, with the advent of BART, greater emphasis was placed on regional public transportation instead of local and sub-regional transit improvements within San Francisco. Nonetheless, a serious transit planning capability is only a relatively new function of Muni.

Once transit planning was undertaken, the types of improvements we have included in the GNBA surface naturally (see, for instance, "Coordinated Transit for the San Francisco Bay Area -- Now to 1975," Simpson & Curtin, 1967). Muni's preoccupation during the period 1955-1965, however, was in incremental solutions to problems associated with an aging fleet and declining patronage.

3. Physical Description

The specific extent of Muni service improvements would depend on the likely level of funding that would have been available (this item is still under study). The following, however, are some of the major improvements that might have been implemented by 1975:

- Replacement of streetcar fleet with modern or rebuilt equipment.
- Upgrading of tracks, as required, of all five streetcar lines.
- Modernization of bus fleet (motor coaches and trolleys).[1]
- Increased use of express buses, especially from the southeastern and southwestern areas of San Francisco (utilizing freeway exclusive bus lanes during peak periods).[2]
- Improved bus frequencies to reduce peak hour loading ratios (predominantly in the BART Mission Street Corridor).[3]
- Generally, in the Mission Street Corridor, a level of improvement has been assumed that would be equivalent (in terms of passenger miles) to the 1975 passenger miles operated by BART in this corridor.[4]

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[1] Northern California Transit Demonstration Project: "Coordinated Transit for the San Francisco Bay Area - Now to 1975," Simpson & Curtin, October, 1967.

[2] Ibid.

[3] Ibid.

[4] Ibid.

4. Likely Authority for Implementation

Muni would likely be the authority for implementation of this alternative.

5. Likely Period of Implementation

The period during which the upgrading would have taken place would have been primarily during the period 1965-1970.

6. Order-of-Magnitude Costs (Partial Costs Only)

The capital cost for improvements under this alternative would be approximately $51 million by 1970. It is not known what the annual additional operating cost might be.

7. Evaluation of Viability in GNBA

Muni service in San Francisco is directly competitive with BART on only a small portion of its local network. Thus, pressures to improve service -- which have occurred during the past five years -- are relatively independent of BART.

The public demand for transit services in the city would have existed in a No-BART scenario. While it may not have been different for much of the local and feeder service, certainly the public desire for improvements in the line haul service on certain commuter corridors (such as the Daly City-Financial District route) would have increased. Thus, the overall public expectations of Muni would have experienced a net increase, particularly by 1970-1975, when environmental pressures were renewing the public interest in mass transit.

Fortunately, the National Mass Transportation Assistance Act of 1970 also provided the means to satisfy public demands. Muni began its service improvements in 1970 with a $17 million purchase of coaches. In the GNBA, this beginning might have been followed more rapidly with the improvement program presently underway. Without distracting management attention and financial resources to the Market Street improvements and the needs of subway/surface streetcars, it can be assumed that the present transit improvement program would have been implemented prior to 1975.

B. Preferential Bus Lanes on San Francisco Freeways

1. General Function

The purpose of this alternative would be to provide low capital cost and short-range improvements for transit users in the Outer Mission/Ingleside, McLaren Park, and Bayview areas of San Francisco The general objective would have been to shorten bus travel times from these areas to downtown San Francisco relative to auto travel times and to enhance, thereby, the use of transit.

2. Degree of Actual Planning Conducted

Due to the anticipation of BART and the fact that preferential use of freeway lanes has received attention only very recently, little planning of preferential bus lanes was conducted prior to about 1970. The "San Francisco Transit Preferential Streets Program" of 1973 addresses the preferential treatment of transit on arterial surface streets but does not contain recommendations for preferential freeway lanes. However, it appears likely that the use of Highway I-280 for regional and sub-regional transit purposes would have been considered to provide greater travel capacity in this general corridor now served by BART.

3. Physical Description

- Peak period (6 a.m. to 9 a.m. and 4 p.m. to 7 p.m.) exclusive bus lanes operated inbound in directional flow or as contra-flow lane depending on physical and operating conditions. If operated in the direction of traffic, use of exclusive transit lane could conceivably have been permitted for car pools (three or more occupants per car).
- On Route I-280 from Ocean Avenue to end of freeway at Third and Fourth Streets (inbound only).
- On Route 101 from about Third Street Interchange to I-280 (continued on eastern leg of I-200 to end of freeway, inbound only).
- Total number of miles operated as peak period preferential bus lane: 7 miles (5.8 miles on I-280 and 1.2 miles on Route 101).

4. Likely Authority for Implementation

It is likely that CalTrans and Muni would be responsible for the implementation of this program.

5. Likely Period of Implementation

This element likely would have been implemented in the period 1970 to 1975.

6. Order-of-Magnitude Costs

The capital cost of the preferential bus lanes would be $400,000. The annual operating cost for roadway operation only would be $600,000.[1]

7. Evaluation of Viability in GNBA

Preferential bus lanes on existing freeways would have represented a fast, implementable, low-cost alternative to match BART's line haul capacity in this corridor. In the absence of BART, travel demand would have increased along with congestion. Any serious planning for a transit-related solution to the travel demand in this corridor would have recognized the potential of I-280. While planning to date has not considered this solution, the oversight may be related to anticipation of BART. Nonetheless, bus lane solutions to congestion and to line haul requirements elsewhere in the county would have encouraged a review of the potential of I-280 and other freeways.

The availability of S.B. 235 money and demonstration grants to cover the capital costs of this improvement, as well as the operating cost, militate for its consideration by transportation planners.

The feasibility of an exclusive bus lane, rather than merely line haul transit service on the freeways, is justified by the projected

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[1] Northern California Transit Demonstration Project: "Coordinated Transit for the San Francisco Bay Area - Now to 1975", by Simpson & Curtin, October 1967.

BART patronage on the Mission line. BART's projected 1975 peak hour, peak direction ridership is equivalent to the capacity of approximately 110 buses per hour. Since this volume is about twice the minimum level of hourly bus volumes which justify exclusive use of freeway bus lanes for bus transit, we believe that bus travel demand would warrant an exclusive lane. While it is assumed that ridership of a bus system would not equal that of BART, nor would Muni respond fully to travel demand, sufficient funds are allocated in the capital cost of upgrading the service to pay for the additional buses required for this service. For the most part, the implication of this service would be to decrease the travel time on routes previously run on arterial streets.

C. Increased Transbay Bus Service

1. General Function

The objective of this alternative would be to increase transit capacity across the Bay in proportion to general travel growth predicted for this corridor. A second objective would be to improve the potential for diverting automobile trips to public transportation and thereby to lessen peak period traffic congestion.

2. Degree of Actual Planning Conducted

During 1953 to 1958, the privately owned transbay transit operator, the Key System, proposed repeatedly to replace their train service with motor coaches on the Bay Bridge. In 1959, the permission to discontinue all transbay and East Bay service was granted to the Key System's service territory. Between Fiscal Year 1961 and Fiscal Year 1974, A.C. transbay bus ridership has increased at an average rate of 6.7% per year with the steepest increase occurring from 1961 to 1965 and between 1973 and 1974. As of spring 1973, approximately 50% of all transbay travel during the morning peak hour was carried by A.C. Transit (36%) and Greyhound (14%) buses. For purposes of defining the amount of transbay bus service increase, it is assumed that the past growth trend of A.C. and Greyhound transbay service would have continued to 1975 without BART.

3. Physical Description

- Increase of A.C. Transit transbay bus service from East Bay communities to the Transbay Terminal in San Francisco. Projected annual additional bus miles operated in 1975, as compared to a "with-BART" situation, would be 2.8 million bus miles which is equivalent to a 23% increase.
- Increase of Greyhound or equivalent A.C. Transit service from Contra Costa County to the San Francisco Transbay Terminal. It is assumed that virtually all commuter bus service from Contra Costa County to Oakland and San Francisco would be discontinued by 1975 under the "with-BART" situation.
- The Bay Bridge would be utilized by the buses.

4. Likely Authority for Implementation

A.C. Transit and Western Greyhound would be responsible for handling the increased transbay bus service.

5. Likely Period of Implementation

The increased bus service would have occurred in the 1970-1975 period.

6. Order-of-Magnitude Costs (A.C. Transit only)

Capital costs for vehicles only by 1975 would total $4.5 million. The annual operating costs would be $3.5 million.

7. Evaluation of Viability in GNBA

Increased bus service appears to be the most viable solution for providing additional transbay travel capacity. The reasonability of this system component in the GNBA is documented by the effectiveness of transbay bus service in the essentially No-BART environment through 1974. Transit demand in the transbay corridor was met by bus service provided by A.C. Transit.

D. Bay Bridge Preferential Bus/Car Pool Lanes

1. General Function

The purposes of this component would be to minimize delays for transbay transit and car pool users as an incentive for greater transit use and car pooling; to increase the overall bridge capacity in terms of persons carried per peak period; and to reduce transit operating costs by increasing transbay schedule times.

2. Degree of Actual Planning Conducted

Peak period exclusive bus and car pool lanes on the eastern approach to the Bay Bridge throughout the toll plaza area were initiated during the early Seventies. Separate, non-stop lanes are provided for A.C. Transit and Greyhound buses and for cars carrying three or more passengers throughout the bridge approach area that generally is affected by traffic congestion during the commute hours. In 1974, traffic metering signals were added, giving preference to buses and car pools and improving traffic flow on the bridge itself. During the peak hour, approximately 50% of all persons crossing the bridge are currently transported in buses.

3. Physical Description

- Preferential bus lanes on the bridge approaches as operated today. All-day exclusive lanes would exist between the East Bay Terminal and the Bay Bridge while preferential transit lanes on the eastern Bridge approach (westbound direction only) would be operated during the morning and evening peak periods only.

- Little need would exist for exclusive transit lanes across the bridge itself or in the eastbound direction on the easterly bridge approaches. An exclusive bus lane was operated on an experimental basis across the entire length of the bridge during conversion of the bridge decks to one-way operation. This experiment was discontinued due to problems of enforcement.

- It is assumed that the peak hour bus lanes would be operated through the freeway distribution structure near the toll plaza (I-80, I-580).

- It is also assumed that use of the peak period transit lanes would be permitted for car pools (three or more occupants per car).

- Traffic engineering improvements in the vicinity of the toll plaza would be used to facilitate operation of preferential bus/car pool lanes and to increase overall vehicle capacity of the bridge.

- Such traffic engineering measures would consist of metering of traffic flow at the toll plaza similar to existing controls. Westbound traffic would be controlled just prior to the merging area to gauge entering traffic to capacity of bridge. Special "free signal" for bus and car pool lanes.

4. Likely Authority for Implementation

This component would be administered by CalTrans, Division of Bay Toll Crossings, and the transit service operators (A.C. Transit and Western Greyhound Lines).

5. Likely Period of Implementation

Preferential bus lanes would have been instituted in the period 1970 to 1975.

6. Order-of-Magnitude Costs

The cost of implementing preferential bus lanes is negligible.

7. Evaluation of Viability in GNBA

Preferential bus and car pool lanes on the Bay Bridge constitute a low-cost and effective transit improvement. In the absence of BART, it is possible that the traffic engineering methods which have been taken on the Bay Bridge may have occurred earlier in the 1970 to 1975 period. In addition, some improvements to the existing traffic engineering methods are assumed to have occurred as transportation planners sought highway improvement measures as ways to reduce congestion rather than relying on BART's projected impact.

Precedents for this GNBA component exist in the improvements which have been implemented despite BART.

E. Increased East Bay Express Bus Service

1. General Function

The purpose of this component would be to provide additional transit capacity and faster transit service among East Bay communities and between the East Bay and downtown San Francisco. As actually occurred, certain East Bay travel corridors would have experienced transit ridership increases during the 1965 to 1970 period that would have made the initiation of express service feasible.

2. Degree of Actual Planning Conducted

In accordance with the operational and short-range nature of this improvement component, the planning for expanded express bus service was conducted as part of A.C. Transit's day-to-day operations planning rather than on a formal and large-scale basis. In response to increasing transit needs in the East Bay, express bus service was actually provided by A.C. Transit in 1973 between the following East Bay communities or corridors:

- Richmond-Oakland
- Hayward-San Lorenzo-San Leandro-Oakland
- Berkeley-Oakland-Alameda
- MacArthur Boulevard-Jack London Square
- Washington Manor-Oakland
- Warren Boulevard
- San Leandro-Bancroft Avenue-Oakland

It can be assumed that without BART this established trend would have continued through 1975.

3. Physical Description

MTC's Transit Development Program has identified certain East Bay arterial streets and freeway segments that have significant transit usage. Since these roadway facilities represent major regional corridors of travel in the East Bay, it appears likely that increased bus service would have occurred predominantly on the following roads:

- Arterial Streets:

  Telegraph Avenue, Oakland-Berkeley
  MacArthur Boulevard, Oakland-Hayward
  Broadway-College Avenue, Oakland-Berkeley

Shattuck Avenue, Oakland-Berkeley
San Pablo Avenue, Oakland-Richmond
East 14th Street, Oakland-San Leandro
University Avenue, Berkeley

- Freeways:

Nimitz Freeway (Route 17) from San Francisco-Oakland Bay Bridge to San Leandro
MacArthur Freeway (I-580) from Bay Bridge to Grand Avenue
Grove-Shafter Freeway (Route 24) from downtown Oakland (Grand Avenue) to Telegraph and Claremont Avenues
East Shore Freeway (I-80) from Bay Bridge to University Avenue

It is assumed that increased transit service over these routes would have consisted primarily of peak period express bus service in response to transit commuting between East Bay cities and between the San Francisco-Oakland Bay Bridge and the Southern Crossing.

The amount of additional East Bay bus service that would have been operational in 1975 without a BART system has been assumed to correspond to the percentage increase estimated for transbay express bus service, namely, in the order of about 33%. In terms of 1975 annual bus miles operated, this increase would amount to 400,000 express bus miles attracting a projected additional ridership of about 650,000 annual passengers.

4. Likely Authority for Implementation

Increased East Bay bus service would have been handled by A.C. Transit.

5. Likely Period of Implementation

Service expansion would have occurred during the period 1960 to 1975.

6. Order-of-Magnitude Costs (Exclusive of Transbay Service)

The capital cost for vehicles only would be $700,000, and annual operating costs would be $500,000 in 1975.

7. Evaluation of Viability in GNBA

The feasibility of East Bay express bus service in a No-BART scenario is evident from the actual experience which occurred in the East Bay until the commencement of revenue service by BART. Given the general public acceptance of the standards of express bus service in the East Bay and the demonstrated feasibility in terms of funding and environmental concerns, it is assumed that, in the absence of BART, the established trend of express service by A.C. Transit in the East Bay would have continued.

F. Increased Regional Bus Service in Contra Costa County

1. General Function

The objectives of this component would be to increase transit capacity for travel from Contra Costa County to Oakland and San Francisco in proportion to general travel growth predicted for this corridor and to improve the potential for diverting automobile trips to public transportation and thereby to lessen peak period traffic congestion through the Caldecott Tunnel and on tunnel approaches.

2. Degree of Actual Planning Conducted

During the period 1960 to 1970, regional transit service in Contra Costa County operated by Western Greyhound Lines has experienced an average increase of about 17% per year, indicating an increasingly greater demand for public transportation.

A composite of several travel projections prepared during 1969 to 1971 indicate a total 1975 demand of approximately 154,000 daily person trips through the Caldecott Tunnel. About 80% of this demand could be accommodated by automobile travel, assuming six lanes on Route 24. For purposes of the GNBA, it has been assumed that the remaining 20% or about 30,000 daily person trips would be carried by expanded regional bus service. In terms of service levels, the 30,000 daily transit trips represent approximately 6 million bus miles per year.

3. Physical Description

- Expanded regional bus service primarily during peak periods between communities of Contra Costa County and downtown Oakland and San Francisco.

- Initially (1960 to 1970), Greyhound would have continued expanding bus service to Contra Costa County. At a later time (1970-1975), take-over of Greyhound bus service by A.C. Transit could have likely occurred.

- It is assumed that increased bus service would have been primarily directed at satisfying regional travel demand and that local bus service within Contra Costa County would have been operated only incidental to regional service.

- The level of regional bus patronage for 1975 has been assumed to correspond to the excess highway demand that would exist in 1975 in the Caldecott Tunnel Corridor. The required bus service would amount to about 6 million bus miles per year (1975) serving about 30,000 daily transit riders. This estimate is based on the assumption that no regional bus service through the Caldecott Tunnel corridor would exist in 1975 with BART in operation.

4. Likely Authority for Implementation

Western Greyhound would have handled the expanded service during the period 1960 to 1970, with A.C. Transit assuming this service during 1970 to 1975.

5. Likely Period of Implementation

This service would be continuously expanded from 1960 to 1975.

6. Order-of-Magnitude Costs

Capital cost for vehicles would be $18 million, and annual operating costs would be $7 million at 1975 cost levels.[1]

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[1] Alan M. Vorhees' calculations.

7. Evaluation of Viability in GNBA

Increased regional bus service in Contra Costa County represents a relatively low cost transit alternative that would be similar to what actually occurred in the Berkeley Hills Corridor prior to BART. Even conservatively estimated travel demand projections for 1975 exceed the available highway capacity during peak periods. Thus, a transit element would clearly be required. In the absence of BART, increased bus service would represent the most viable and acceptable solution for improving public transportation between Central Contra Costa County, Alameda County, and San Francisco.

Western Greyhound lines has continuously sought to eliminate this service. It is assumed that, in the absence of BART, the A.C. Transit position would be to consolidate the regional transportation function. It would appear that A.C. Transit, with the regiona responsibility, would be an appropriate operator to assume Greyhound's commuter service. Consequently, we have assumed that, in the absence of BART, A.C. Transit would provide this service. The cost of that acquisition would total the capital cost to replacing Greyhound's vehicles with coaches of A.C. Transit's standards.

G. Preferential Bus Lanes Through Caldecott Tunnel

1. General Function

The objectives of this component would be to increase overall tunne capacity in terms of persons carried per peak hour; to minimize congestion delays for transit users as an incentive for increased transit ridership; and to reduce transit operating costs by increasing bus travel times.

2. Degree of Actual Planning Conducted

Little, if any, actual planning of preferential bus lanes has been conducted because of anticipation of BART and lack of general traffic congestion in this corridor. If one assumes that, without BART, Highway 24 east of the tunnel would have been built by 1975 only as a six-lane facility instead of the now existing eight lanes, it appears that peak hour congestion would have reached a point in 1975 (or even earlier) at which preferential bus lanes on the tunnel approaches and possibly through the tunnel itself would have been seriously planned and implemented by 1975. The projected bus level has been sufficiently high in 1975 to justify exclusive bus lanes during peak periods (the projected level is about 200 buses per peak hour).

3. Physical Description

- Preferential bus lanes operated during peak periods in the prevailing peak direction of traffic flow. Operation is assumed to include tunnel approaches and the tunnel itself.

- Westbound preferential bus lanes would extend from about the Orinda interchange to Tunnel Road and eastbound preferential bus lanes from about the Broadway interchange to beyond the eastern tunnel portal.

- Since the third tunnel would have been built independently of BART, it could have been utilized in reversible operation during peak periods, resulting in three traffic lanes in the peak direction plus one exclusive bus lane.
- Total length of preferential peak hour bus lanes would be 6 miles (2.5 miles in westbound direction during the morning hours and 3.5 miles in eastbound direction in the afternoon).

4. Likely Authority for Implementation

In conjunction with the regional transit authority, CalTrans would be responsible for implementing this component.

5. Likely Period of Implementation

This component likely would have been implemented in the period 1970 to 1975.

6. Order-of-Magnitude Costs

The capital cost of a preferential bus lane through the Caldecott Tunnel would be $400,000 in 1975, and the annual operating costs for the roadway operation only would be $500,000.

7. Evaluation of Viability in GNBA

Preferential bus lanes are a rapidly implementable and low-cost improvement for the Caldecott Tunnel corridor. This corridor, in the absence of BART, could well become congested (although it would have resulted in Route 24 being built to only six lanes instead of eight). While the absence of BART undoubtedly would have had some land use impacts in this area, the growth pattern is still assumed to have been sufficient for estimated hourly bus volumes in 1975 to warrant exclusive bus lanes during peak periods.

H. Route 24 in Contra Costa County as a Six-Lane Freeway

1. General Function

This component represents a reduction in transportation capacity rather than an addition. Although there probably would have been a demonstrated need for an eight-lane Route 24 freeway, it has been concluded that the expansion to eight lanes would not have occurred by 1975 if BART had not been built.[1]

2. Degree of Actual Planning Conducted

The 1958 Contra Costa County Report on Highways indicated a widening of Route 24 as a first priority. Plans called for an expansion of the Caldecott Tunnel to Orinda Junction segment to eight lanes and of the Orinda to Walnut Creek segment to six lanes by 1963. By 1980, these sections were to be widened to ten and eight lanes, respectively. While a third Caldecott Tunnel, designed as a reversible facility, was subsequently implemented independently of BART, it appears questionable whether more than a six-lane facility would have been built without BART. Graded right-of-way for six lanes existed while an expansion to eight or ten lanes would have required additional right-of-way acquisition and major reconstruction. Discussions with CalTrans staff indicate that funding for a widening beyond six lanes would not have been available without BART functioning as a major stimulus for reconstruction and without BART' advancing funds to the state for freeway redesign and reconstruction.

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[1] Joseph Browne, op.cit.

3. Physical Description

- Section of Route 24 that would not have been reconstructed: Caldecott Tunnel to Walnut Creek interchange with Highway I-680.

- Length of section that would have been widened to six lanes instead of to eight or ten lanes would be 9 miles. The number of lane miles not built would be 27 miles, which assumes that 50% of the segment is now built as a ten-lane facility.

4. Likely Authority for Implementation

CalTrans would be responsible for this component of the GNBA.

5. Likely Period of Implementation to Six Lanes

The expansion would have taken place in the period 1965 to 1970.

6. Order-of-Magnitude Costs

A cost savings (1973) would have occurred in the order of about $32 million based on assumed unit cost of $1.2 million per lane mile. According to CalTrans regional representatives, the priority for expenditure of these funds likely would have been on completion of Route 4 between Interstate 680 and Route 242. Any excess funding would have been committed to completion of Route 101 between Cochran Road and Fort Road in the Morgan Hill area of San Jose.

7. Evaluation of Viability in GNBA

The impetus for the expansion of Route 24 to an eight-lane facility emerged solely from the interaction of BART and the Division of Highways. If BART had not loaned funds to the state for freeway redesign and reconstruction, in conjunction with the BART alignment, the Division of Highways would not have expanded Route 24 to eight lanes. Thus, in a No-BART scenario, Route 24 would be a six-lane facility rather than an eight-lane facility.

I. Completion of Route 4 (John Muir Parkway) in Contra Costa County

1. General Function

The general purpose of this improvement has been to facilitate regional circulation, especially among the industrial areas along the Sacramento River. It also affords a relief from potential congestion on Route 24 by offering a by-pass for intercity and through traffic. Finally, it offers freeway access to suburban and industrial communities such as Antioch, Pittsburg, Concord, Martinez, and Pinole.

2. Degree of Actual Planning Conducted

The completion of this freeway between Pittsburg and Pinole in Contra Costa County was recommended in the County's Highway Master Plan of 1957. The facility was assigned first priority for construction to "serve or supplement other first priority construction elements to make them function efficiently and provide an integrated network." "First priority" at that time, meant implementation by approximately 1963. Certain segments of Route 4 east of Martinez have been constructed or are under construction. More recently, greater priority has been assigned to the segment east of I-680 while the western portion of Route 4 has been given less emphasis.

3. Physical Description

Upgrading of Route 4 to freeway standards between I-80 in the west and Railroad Avenue in Pittsburg in the east. Only certain segments of this facility are now existing as grade separated facility.

At-grade alignment would follow the existing Route 4 and cover a total length of new construction of about 23 miles. Assumed cross section: two to three lanes per direction depending on need and location.

4. Likely Authority for Implementation

The Division of Highways of CalTrans would have been responsible for completion of this component, since it is a state route.

5. Likely Period of Implementation

Completion of the link between I-680 and Route 242 would have occurred between 1970 and 1975 as an extension of present improvements. The funding diversion to Route 4 improvements -- dividends from building Route 24 to only six lanes instead of eight -- is also estimated to have occurred during this period, which is when the accounting event occurred which rescinded the Division of Highway's debt to BART (for an advance of funds).

6. Order of Magnitude Costs

The capital cost of this final segment is estimated at approximately $25 million, which is an inflated total based upon a 1957 estimate, less the projected $17 million segment presently under construction.

7. Evaluation of Viability in GNBA

The completion of Route 4 in Contra Costa County has been initially unopposed in either financial or political contexts. Its delay has been based upon financial constraints only. With the savings in committed funds which a six lane Route 24 would have affected, Route 4 could have been completed -- particularly given its high priority.

IV. CONSIDERATION OF THE SOUTHERN CROSSING

The Southern Crossing -- a major Bay crossing, perhaps with a transit median -- represents the most significant potential component of the GNBA in terms of the overall impact on the transportation network of the Bay Area, not only in terms of the bridge itself, but also in terms of the approaches and access highways, and the necessary diversion of financial resources. Investigation of the likelihood of this potential component has been thorough, including extensive interviewing, yet the final determination of its inclusion in, or exclusion from, the GNBA's systems can be based, in the end, only upon "best professional judgment," given conflicting opinions on its public acceptability. It cannot be denied that highway planning forces and Toll Bridge Authority were firm in their commitment to the project, furthermore, an undisputed source of funding -- low revenue bonds -- were available for its financing (and for its approaches). It is also evident that by 1972 popular opposition to the new Bay crossing, based on environmental questions was substantial, dramatized by the major defeat it suffered as a resolution on the ballot in six Bay Area counties -- San Francisco, Alameda, Contra Costa, Marin, San Mateo and Santa Clara.

Between these two considerations the viability of the Southern Crossing as a component of the GNBA is defined. The BART transbay tube and its approaches were financed from the bonding capacity of the toll bridge revenues. Without this commitment of

Toll Bridge Authority financing, would the internal impetus for engineering and construction of the Southern Crossing been advanced in time? If engineering had been completed earlier, would construction have been started and completed prior to the emergence of strong public awareness of the environmental issues which effectively killed the Crossing's prospects?

Disagreement on these two questions, even among key actors in transportation planning, is legion. Moreover, this disagreement is evident among both proponents and opponents of the Crossing; neither group is unanimous in their evaluation of the Crossing's prospects. This attempt at recreating, retrospectively, an alternative future for transportation in the Bay Area is wrought with the perils of second-guessing and polarization. Inevitably, however, our interviewing process resulted in interviews commenting on the sheerly speculative nature of a determination of whether or not the Crossing would have been implemented by 1975, in the absence of BART.

In our judgment, it probably would not have occurred. Nonetheless, we recognize the strong arguments for speculating that it would have occurred. We also recognize that MTC may choose to include the Southern Crossing in the GNBA for purposes of the BART Impact Program.

A. The Chronology

An additional toll crossing of the Bay, south of the Bay Bridge, has been an element of the transportation planning of the Bay Area since 1927. The relationship of that crossing to BART emerged from the engineering and financing studies for Bay Area Rapid Transit which culminated in the 1957 Report to the Legislature by the BART Commission, in which bridge tolls were considered a source of funding for transit improvements. A year earlier, however, a financing study for the proposed Southern Crossing[1] did not consider the new bridge financially feasible. In 1957, the legislature rescinded the existing provisions regarding the Southern Crossing unless it was financed, adequately, by July 1, 1958. Thus, by 1958, the Southern Crossing had been delayed quite independent of BART's early planning.

In that year, however, the preparation of surveys and studies for a toll bridge crossing or other toll highway crossing across San Francisco Bay between the County of Alameda on the east side of the Bay and the City and County of San Francisco (or the County of San Mateo) on the west side was authorized by the legislature. The same year the Toll Bridge Authority directed an informational report be prepared summarizing all the studies which previously had been made of the Southern Crossing. The conclusions of the 1959 study[1] included the following:

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[1] Report on the Financial Feasibility of the Proposed Southern Crossing of San Francisco Bay, September, 1956. Prepared for Department of Public Works by Smith, Barney & Co.

- Reconstruction of the San Francisco/Oakland Bay Bridge would add 25% to 30% to its traffic carrying capacity.
- Although origin and destination surveys showed that most of the transbay traffic would prefer to use the San Francisco/Oakland Bay Bridge, traffic predictions indicated that the Bay Bridge, when altered to an all-vehicular structure with one-way traffic on each deck, would not again reach the congestion of 1959 until 1972.
- The proposed plan for the improvement of the present San Mateo/Hayward Bridge would more than double its capacity.
- Estimates of future traffic indicate that a six-lane structure would not be required between San Mateo and Hayward until 1998.
- The reconstruction of the San Francisco/Oakland Bay Bridge and the San Mateo/Hayward Bridge would relieve the 1959 level of congestion for a full decade; however, before new developments obstructed the remaining feasible routes, the location of a new crossing should be designated and rights-of-way protected.
- Funds should be appropriated and work authorized for the preparation of surveys, plans, estimates, the obtaining of traffic and financial studies, and any other work required

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[1] Studies of Southern Crossings of San Francisco Bay, Division of San Francisco Bay Toll Crossings, Dept. of Public Works, January 1959.

to determine the most desirable Southern Crossing location for construction of a crossing at an appropriate time when traffic needs and financial feasibility exist.

- Federal and state legislation would be required for the state to construct a crossing for the sole use of rapid transit.

In 1959, then, a requirement for an additional crossing, by the Toll Bridge Authority's own evaluation, did not appear pressing, although further studies were recommended. At the same time, consideration was given to possible financing of a rapid transit tube.

The crucial period in evaluating the likelihood of the Southern Crossing's impelemtation, in our estimation, concerns the years 1959-1963. In November 1963, Mike Foley was hired as Chief Engineer with the implied responsibility to proceed with the Southern Crossing, a course of action made official by Toll Bridge Authority directors in April, 1964. There was no concern at that time, according to Chief Engineer Foley, with the counsel of his financial consultants, Smith Barney and Company, about the Authority being able to finance the BART transbay tube and proceed with the engineering, design and, ultimately, financing of the Southern Crossing, estimated at $350 million. (The only BART-related question which arose in connection with financing was whether or not the Authority could pay the $55 million for the northern approach on the East Bay side. Without BART, that total could be accommodated by the Toll Bridge Authority's bonding capacity; without BART, the Division of Highways was to have been responsible -- a responsibility the Division of Highways had no way of meeting, by their own admission.)

Neither former Governor Brown, former Chief Engineer Foley, nor the Staff Engineers ultimately in charge of the Southern Crossing project was able to document, in interviews, that the hiatus in planning between 1959 and 1964 was due to a reluctance to proceed because of the financial commitment to BART. On the other hand, the opening of tunnel construction bids in December, 1965, and the concomitant realization that the Toll Bridge Authority was committed, through inflation, to bid $40 million higher than the original $133 million estimates did cause a pause in the planning process, as the excess revenues of the bond issue, which were to be used for financing engineering and floating additional bonds, became committed for the tube.

Senior engineers at the Toll Bridge Authority who were involved in the Southern Crossing planning stated that the internal impetus to plan the new bridge was essentially defused by the 1959 report, which identified no immediate need for the crossing. The Chief Engineer, who sat on the board, however, feels there was never any doubt that the Authority intended to build the bridge; timing was the only question.

Subsequent to the Toll Bridge Authority's decision to proceed, however, the latest phase of planning and engineering began, with a report to the legislature in February, 1966. This report followed the recommendation of the 1959 study, focusing primarily on the feasibility studies of alternative locations and on evaluation of tunnel technology versus bridge technology. The Legislature approved the proposed location between India Basin and Bay Farm Island and appropriate Bay Bridge tolls to commence planning and engineering of a bridge at that location. The 1966 report projected a construction start of 1968, although this was later revised to 1971. While trellises and approaches might have been started, the bridge itself required considerable engineering; the project manager for the Authority does not feel the engineering consultants could have accelerated the work. The Chief Engineer, on the other hand, does. Regardless of the initiative of the process, $8 million was ultimately spent.

In August, 1969, a permit was requested from the Coast Guard for a bridge across navigable waters. Two years later the Coast Guard denied the permit request based on the uncertainty of the environmental impact, noting in the denial that reconsideration should be given after the impact of BART on traffic demand had been measured.

In November, 1969, the Bay Conservation and Development Commission (BCDC) granted permission for the construction of that part of the

Southern Crossing within BCDC's jurisdiction on a 17-6 vote. The record public hearing on the issue, however, was attended by as many as one hundred opponents, according to one Authority witness.

In June, 1972, in response to vocal opposition to the Crossing, which was well orchestrated by a coalition of groups called the Southern Crossing Action Team, a proposition was placed on the ballots in six Bay Area counties asking whether the Toll Bridge Authority should require further specific approval in order to build the Crossing. The voters' response was resoundingly "yes," which became a de facto plebiscite to cease planning, engineering, and construction.

Without this political defeat, it was estimated that final engineering of the structure would have been complete by June, 1972.

B. Forces of Influence

As is the case with any major transportation development, the Southern Crossing inspired both advocates and opponents. This section seeks to determine the impact that the absence of BART's planning might have had on their actions and reactions relative to planning and implementing the Crossing, even if consideration of the Crossing has preceded the period of BART's implementation. To some extent, this section provides an expansion of the policy assumptions described in Section II.

1. Advocates of the Southern Crossing

The planning process of a highway-related transportation development has a built-in momentum which results in advocacy efforts by the state and federal administrative bureaucracy, state legislature, motorists' associations, business and commerce representatives, and occasionally the Governor. The Southern Crossing was certainly no exception. Even in the abortive planning which occurred, it enjoyed full support of the traditional proponents of highway expansion.

Among the administrative bureaucracies which initiated and sustained the planning for the Southern Crossing were the State Division of Highways and the State Toll Bridge Authority. Both are distinguished by certain political autonomy and relatively independent funding. The advocacy of each is automatically triggered by its respective mandate; in the case of a highway bridge, the substantial influence of both is brought to bear on the decision-making process.

Additionally, the planning efforts were supported by the Executive branch. The bureaucratic advocacy of the Southern Crossing was aided, during the early 1960's, by Governor Edmund G. Brown, Sr., an ardent supporter of public works. As Governor, he had the political capital and influence to encourage action. Furthermore, he was chairman of the Toll Bridge Authority. His support of construction, however, was not limited to the Southern Crossing; he also was instrumental in the implementation of BART. Nonetheless, according to the former Governor, his commitment to a Southern Crossing was total; he did not fail to bring Executive powers to the aid of the Southern Crossing. Were it financially feasible, he would have supported an earlier start on the Crossing. However, to his recollection, an earlier start does not mean that the Crossing would have been advocated prior to 1964.[1]

Legislative support for the Crossing also was apparent, although not consistently so. In the early 1960's, legislators saw the Toll Bridge Authority as a remarkable element of government in that it produced revenues in excess of its costs. Although many proponents of highways favor toll-free bridges, this philosophical preference frequently is muted when toll revenues are used to finance improvements to the highway network. Later in the 1960's, with the encouragement of Governor Reagan's administration, eliminating tolls on the bridges became a more vocal objective of some legislators. However, in the early 1960's, according to the Chief Engineer of the Toll Bridge Authority, the Legislature generally supported the Authority's plan to construct the Crossing from revenues of existing bridges.[2]

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[1] Interview with former Governor Edmund G. Brown, February 10, 1975.

[2] Interview with Michael Foley, former Chief Engineer, Division of Bay Toll Crossings, February 7, 1975.

Thus, the Toll Bridge Authority's advocacy of a Southern Crossing had considerable support from the Executive and legislative branches of the State government within the bounds, of course, of fiscal responsibility. The momentum of this support, which is linked to the traditional highway planning process, would not be expected to have changed in a scenario with BART as an element of transit planning in the early Sixties.

The Southern Crossing also had support from the industrial and commercial communities. The Bay Area Council, the highly influential advocate of regional economic development which played a large role in support of BART, was among the groups which favored the Crossing. Our interviews with key actors of the Toll Bridge Authority indicate there was little additional support the Council might have given the Crossing in the absence of BART during that period. Supplementing the Bay Area Council's support were many local Chambers of Commerce which took stands in favor of implementing the Southern Crossing.

The public, of course, also provides its advocates. The motorists' associations, commonly referred to as part of the "highway lobby," favored the bridge. The strong popular demand for congestion relief, however, did not seem to exist. Despite the projections of congestion by BART and Southern Crossing planners, public demand for increased travel capacity was not apparently strong. As predicted in the Toll Bridge Authority's 1959 report, the demise of the Key System had increased capacity on the Bay Bridge. Further, in that year, A.C. Transit commenced frequent and effective transbay service, with patronage increasing to a full 50% of peak hour travelers. Also, during the 1960's the peak period lengthened from one to three hours. Thus, public perceptions of congestion in the transbay corridor, which might have accelerated planning of the Southern Crossing, were not increasing, even in the absence of BART's travel capacity.

2. Opponents of the Southern Crossing

The confrontation between organized citizens groups and the Toll Bridge Authority which halted the planning and implementation of the Southern Crossing in 1972 frequently is characterized as a polarization which might not have occurred prior to the activist movements of the late Sixties. Our research indicates that the groups which took the strongest stands against the Crossing would have provided effective opposition in the last half of the Sixties, certainly by 1967-1968.

While the "Let's give BART a chance" argument sometimes is considered to have been the major issue in the public campaign against the Southern Crossing, it was dwarfed by environmental concerns. These concerns were not only related to the increase in air pollution caused by more automobiles on the new bridge, but also to the impact on land use that it would have. The bases of this environmental concern were evident as early as 1965.

Awareness of environmental issues emerged throughout the nation in the mid-1960's. In 1965, the California State Legislature passed the McAteer-Petris Act which established the Bay Conservation and Development Commission (BCDC). This Act clearly was in response to growing environmental consciousness. By 1968, national concern had justified passage of the Environmental Protection Act.

Also in 1968, the so-called "Battle of the Bay" was fought among environmentalists seeking a meaningful plan for conservation of San Francisco Bay and its shoreline. The Battle of the Bay was conducted locally and in the Legislature by the same coalition of environmentalists who later were to become the core of the Southern Crossing Action Team (SCAT). Thus, long before the 1972 ballot proposition which led to defeat of the Southern Crossing, there was active, organized resistance to projects perceived an environmentally unsound.

The readiness of the opposition to the Southern Crossing is underscored by the speed with which forces were mustered. In November, 1969, the BCDC granted a permit for the Southern Crossing. That month, the number of Bay Area "environmental" groups increased from 90 to 200. SCAT, the most active group in opposing the Southern Crossing, directed the thrust of its opposition toward the issue of increased air pollution which additional traffic would generate. While SCAT included adverse competition with BART as one of 17 reasons for objecting to the Southern Crossing and placed this issue as one focal point for justifying its stand, the primary concern was environmental.

Finally, the opposition which resulted in such a resounding defeat for the Crossing in the 1972 plebiscite came from non-BART counties as well. This leads to the conclusion that, indeed, the bases for resistance to the Southern Crossing was more complex than simply to "give BART a chance."

As a nationally popular trend during the late 1960's, there was a general shift away from massive solutions to problems toward more flexible, small-scale, human-sized solutions in areas such as government programs for poverty, urban renewal or massive public works. Thus, the public sentiment which probably would have prevented the implementation of BART in lieu of a bus-oriented technology in the late Sixties was another sentiment brought to bear on the issue of the Southern Crossing. This response was not dependent upon BART; it reflected a growing national attitude.

While we believe the nature of the opposition would not have changed either in the absence of BART or if planning and engineering had occurred earlier, one opponent would not have been involved: BART. BART's concern with the Southern Crossing was based largely on public financing issues, ostensibly the effect additional bonding by the Toll Bridge Authority would have on interest rates for public issues. Of course, the effect an additional bridge might have on transbay transit patronage, and hence revenues, cannot be ignored. The impact which BART's opposition to the Bridge had on legislators and the public, however, is not absolutely clear: BART's opposition has been characterized as tacit by some and as extremely vocal by others.

C. Legislative Attitudes

The State Legislature, with its control of funding and ability to mandate priorities among transportation developments, was a key actor in the history of the Southern Crossing. It was the State Legislature which placed Proposition A -- a plebiscite on the Legislature's responsibility to control implementation of the Toll Bridge Authority's planning for another Bay crossing -- on the ballot in June, 1972.

One Legislator who was prominent in legislative attempts to stop the Southern Crossing was the late Assemblyman Robert Crown of Alameda, whose proposed legislation to stop the Southern Crossing is credited with the compromise of a ballot proposition. Assemblyman Crown also wrote the ballot arguments in favor of Proposition A. The gist of his arguments was to avoid traffic generation and concomitant pollution. BART was mentioned in the argument, but not as the primary reason for opposing the Bridge. (The arguments are reproduced in Appendix E.)

According to Assemblyman William Lockyer, formerly the late Assemblyman Crown's legislative assistant, Crown's opposition to the bridge surfaced in the late Sixties and would have been less likely to have occurred if the Southern Crossing had been an issue earlier.[1]

A key figure in the Senate, Senator Nicholas Petris of Oakland, is less equivocal in his perception of the probable course of events had the Southern Crossing been an issue in the absence of BART.[2] According to the Senator, the environmental issues which were raised in opposition to the Southern Crossing were "at the height of their strength" in 1968. In that year, the McAteer-Petris Act of 1965 was extended to give permanent stature to the BCDC after substantial public debate. The popular response to the environmental issues that year -- focused on the Battle of the Bay which the Act inspired -- greatly influenced a large number of legislators, according to Senator Petris. There is no doubt in the Senator's mind that the Southern Crossing still would have inspired opposition on environmental grounds even in the absence of BART. Furthermore, he was adamant that the coalition which secured BCDC's future would have held together against the Southern Crossing as early as 1968. He, himself, would have been willing to spearhead Proposition A in the late Sixties if the issue had arisen.

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[1] Interview with Assemblyman William Lockyer, February 25, 1975.

[2] Interview with Senator Nicholas Petris, February 25, 1975.

While the stance the Legislature might have taken on the Southern Crossing is not certain, the position taken by a Senator such as Senator Petris would have been influential in the Legislature's deliberations on the issue. The impact of popular reaction against the Crossing made a strong impression on other legislators. If it had not been for the Governor's threat of a veto of Assemblyman Crown's original bill to stop the Southern Crossing and the Legislature's sense, but uncertainty, that the people might defeat the measure, the proposition would never have reached the ballot. The important point is that legislators were conscious of the issues earlier than 1972.

D. The Public Attitude

If the electorate's perception of the Southern Crossing was based on its redundancy to BART, it is possible that the Southern Crossing would have been built in the absence of BART. On the other hand, if public opposition to the Southern Crossing in 1972 or prior to 1972 was based on perceived traffic generation, growth inducement, financial commitment, or environmental detriment caused by the bridge, that opposition likely would have arisen even in the absence of BART.

Fortunately, sources are available for measuring the attitudes of the public. The vote on Proposition A in 1972 is one example. Table IV-1 documents the results of that vote in which almost 77% of the voters opposed the Southern Crossing. The overwhelming

TABLE IV-1

OFFICIAL VOTE ON PROPOSITION A
June 6, 1972

PROPOSITION A: Shall the California Toll Bridge Authority be permitted to construct the southern crossing bridge without further specific approval by the California Legislature?

Counties	Yes	No
Alameda	78,036	250,144
Contra Costa	46,072	136,680
Marin	16,878	57,625
San Francisco	57,119	140,455
San Mateo	43,223	126,949
Santa Clara	52,986	261,785
TOTAL	294,314	973,638
Percent	23.2%	76.8%

Source: Statement of Vote, California Secretary of State.

opposition to the Southern Crossing in that election precludes an assumption of any transitory reason for defeat of the proposition. On the other hand, it is important to understand the reasons for that opposition in order to assume it might have been equally apparent during any previous period.

Two public opinion polls taken in 1971 provide some indication of the attitude of Bay Area residents to the Southern Crossing. The first, conducted by the Survey Research Center of the University of California at Berkeley, surveyed over 1,000 households. A substantial reason for opposition to the bridge was indeed BART-related, although this consisted of only 30.6% of the total response in opposition to the Southern Crossing.[1] It should be noted that even if 30.6% of the electorate which opposed the Southern Crossing in the 1972 ballot had voted instead to favor the Southern Crossing (if BART were not an issue), the ultimate judgment would not have changed.

The second survey, the "California Poll," was conducted by the Field Research Corporation in May, 1971. Table IV-2 illustrates the response of those who were opposed to the bridge (73%) by the reasons for their opposition. In this survey, only 24% of those surveyed in eight Bay Area counties cited BART-related reasons for their opposition.

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[1] The Survey Research Center poll reflected 163 of 533 respondents opposed to the bridge cited BART-related causes as their first reason for opposition. These respondents cited secondary reasons as well; secondary reasons eventually brought BART-related responses up to 41.0% statistically.

TABLE IV-2

RESPONSES AGAINST THE SOUTHERN CROSSING BY REASON

CALIFORNIA POLL OF MAY 1972

PERCENT OF RESPONSES			
13.7	34	C 01.	IT WOULD RAISE TAXES, MEAN MORE TAXES
9.3	23	02.	COST TOO HIGH, TOO MUCH MONEY
22.6	56	03.	SHOULD WAIT FOR BART, GIVE BART A CHANCE, SEE WHAT BART DOES
1.6	4	04.	ALREADY SPENT A LOT FOR BART
4.8	12	05.	RATHER SPEND ON OTHER THINGS (E.G. EDUCATION, NEEDY), BETTER USES FOR MONEY
8.1	20	06.	IT ISNT NECESSARY, WE DONT NEED IT (NO FURTHER INFORMATION)
6.5	16	07.	POLLUTION MENTIONS, LESS CARS, LESS POLLUTION
14.1	35	08.	ALREADY HAVE ENOUGH (2) BRIDGES
7.7	19	09.	SHOULD CUT DOWN ON TRAFFIC---NO MENTION OF POLLUTION
6.5	16	10.	SHOULD SOLVE THE PROBLEM SOME OTHER WAY, E.G., FERRYS, IMPROVE EXISTING BRIDGES
5.1	13	11.	ALL OTHER RESPONSES AGAINST
100.0	248		TOTAL NUMBER OF RESPONSES

SOURCE: State Data Program
Institute of Governmental Studies
University of California, Berkeley

Furthermore, it was possible to respond with up to four answers. The State Data Program processed the survey results specifically for this study to document the other answers of persons responding with BART-related reasons for opposing the bridge. Table IV-3 reflects that tabulation. Of those who cited BART as a negative determinant in their opinion of the Southern Crossing, 10.2% also specifically mentioned the pollution implications of the new crossing (Response 07). Additionally, 37.3% mentioned non-BART-related transportation reasons: there are already enough bridges (Response 08); traffic should be reduced, without mention of pollution (Response 09); and the transportation problem should be solved some other way, e.g., with ferries or improvements to existing bridges (Response 10). Thus, even if those who cited BART-related reasons for delaying construction of the Southern Crossing were to vote in favor of the Crossing, it would not have affected the outcome of the 1972 election results. Furthermore, given the additional non-BART-related reasons for those voting against the Southern Crossing, the margin of difference in the 1972 Proposition A results would have been inadequate to reverse the verdict.

All of the non-BART-related reasons which interviewees considered in their opposition to the Southern Crossing existed in the late 1960's and early 1970's. Opposition to traffic generation, and awareness of growth control and pollution issues, had arisen prior to the Southern Crossing's defeat. Hence, the impact of BART on these issues is not considered sufficient to reverse the historical

TABLE IV-3

OPPOSITION TO THE SOUTHERN CROSSING

ALTERNATE RESPONSES BY RESPONDENTS CITING BART

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INTERNATIONAL DATA LIBRARY    AND    STATE DATA PROGRAM                                PROGRAM: TABLES
SURVEY RESEARCH CENTER               INSTITUTE OF GOVERNMENTAL STUDIES                 REVISED: 27 SEPT 74
2220 PIEDMONT AVENUE                 109 MOSES HALL                                    DATE:  02/24/75
       UNIVERSITY OF CALIFORNIA, BERKELEY                                              TIME:  21.35.21.

TABLES RUN 7103.
TOTAL      PERCENTAGING IN THE HORIZONTAL DIRECTION

TABLE     5, PAGE      1
*1/52*                        = 2
THE VERTICAL(Y)   VARIABLE IS 2/65-BART
THE HORIZONTAL(X) VARIABLE IS 1/53-ANTI-BRIDGE              **(LIST)**

              00     01     02     03     04     05     06     07     08     09     10     11   TOTAL

1              0      1      2     56      4      2      1      6     10      8      4      1      59
              0.    1.7    3.4   94.9    6.8    3.4    1.7   10.2   16.9   13.6    6.8    1.7      59

0              2     33     21      0      0     10     19     10     25     11     12     12     110
             1.8   30.0   19.1     0.     0.    9.1   17.3    9.1   22.7   10.0   10.9   10.9     110

TOTAL          2     34     23     56      4     12     20     16     35     19     16     13     169
             1.2   20.1   13.6   33.1    2.4    7.1   11.8    9.5   20.7   11.2    9.5    7.7     169
```

The horizontal variables relate to the following coded responses:

1. It would raise taxes, mean more taxes.
2. Cost too high, too much money.
3. Should wait for BART, give BART a chance, see what BART does.
4. Already spent a lot for BART.
5. Rather spend on other things (e.g. education, needy), better uses for money
6. It isn't necessary, we don't need it (no further information).
7. Pollution mentions, less cars, less pollution.
8. Already have enough (2) bridges.
9. Should cut down on traffic--no mention of pollution.
10. Should solve the problem some other way, e.g. ferries, improve existing bridges.
11. All other responses against.

On the vertical, "1" relates to a mention, "2" relates to no mention. The first row corresponds to actual responses, while the second relates to per cent of total response.

SOURCE: State Data Program for McDonald & Smart.

action of eliminating another Bay Crossing even in a No-BART scenario.

E. The Hypothetical Scenario

The previous sections reviewed the historical events which relate to the planning and development process of the Southern Crossing and evaluated the potential forces which might have advocated or opposed a Southern Crossing in a No-BART alternative. This section presents an hypothesis on the timing and planning of the Southern Crossing without BART.

None of our interviews or research has indicated that, in the absence of BART, progress on designing and engineering the Southern Crossing would have occurred earlier than 1964. First, there is no substantial impetus for rapid action, except for the possibility of paying off all bonded indebtedness prior to committing additional funds. Secondly, in the absence of demonstrated excess travel demand, the urgency for an additional bridge was diminished.

We have assumed authorization to proceed with planning the Southern Crossing would have occurred in April, 1964, when the Toll Bridge Authority actually did authorize initial studies. Without any commitment of resources to BART, what might have happened? The Authority would have been capable of committing additional resources to the engineering study knowing that its bonding capacity could be tapped at any time. Instead of the historical engineering process which began in early 1964 and would have culminated in final design in July, 1972, let us assume that the resources were committed to complete the engineering studies in half the actual time, an acceleration of the process which even the Toll Bridge Authority considers inconceivable. Hence, construction would have been scheduled to commence in 1968. That was a year in which local reaction to environmental threats was actively articulated by the precursor of the Southern Crossing Action Team during the Battle of the Bay.

One might argue that the Toll Bridge Authority would have staged construction so that approaches and trestles which did not need BCDC approval would have been constructed early, even as the bridge structure itself was undergoing final engineering. This argument has frequently been taken to provide evidence that the planning process, hence the time to change plans, had passed. Unfortunately, San Francisco possesses a poignant reminder that the groups of this area are willing to stop a transportation development and write off costs. As early as 1959, the public was willing to see highway plans abandoned rather than disrupt the neighborhood fiber and encroach on visual and physical access to the Bay, e.g., the Embarcadero Freeway and the entire freeway revolt. It is conceivable that even an early attempt to "get a spade in the ground" in order to disarm critics would have been unsuccessful.

When the opposition came forward in 1969 and 1970, the administration and legislative supporters could not reverse a popular surge against the Crossing. We have been able to discover no BART-related events which would increase the influence of the advocates of the Crossing in a No-BART scenario. Thus, it is our opinion that sufficient public opposition to the Southern Crossing, on environmental grounds, would have arisen even in the absence of BART. The Southern Crossing, then, would not have been a likely component of the GNBA.

F. Technical Description of the Potential Component

1. General Function

To provide additional vehicular and transit capacity across the Bay. Without BART and the new crossing, BART's engineers projected 1975 travel demand would have exceeded the capacity of the Bay Bridge by 12,000 person trips per peak hour in the peak direction. This deficiency would be equivalent to about 5-6 lanes of freeway per direction or 4 lanes of freeway and an increase of public transportation service by about 80 buses per peak hour per direction.

2. Degree of Actual Planning Conducted

While early proposals called for a parallel bridge adjacent to the existing Bay Bridge, a new crossing location in the India Basin area was recommended during the post-war years by a Joint Army-Navy Board for national defense reasons. The proposed Southern Crossing was subsequently endorsed in the 1948 Transportation Plan for San Francisco as being essential for avoiding future congestion on the existing Bay Bridge.

Detailed engineering feasibility studies of alternative locations and an evaluation of tunnel versus bridge were conducted by the Division of Bay Toll Crossings during 1964-66. These studies resulted in the recommendation of an India Basin-Alameda-Bay Farm Island bridge and the development of a definite financial plan. A construction start of 1968 was considered feasible initially, although this ultimately was projected as 1971.

3. Physical Description

This component involves construction of a new bay crossing just south of the existing Bay Bridge. This crossing would consist of an eight-lane freeway bridge connecting Routes I-280/101 (via Hunters Point Freeway) in San Francisco with Routes 12 and 24 in Oakland/Alameda. It is assumed that the bridge would be a toll facility.

The assumed alignment would be approximately from I-280 at Army Street to the India Basin, then in a northeasterly direction to offshore Alameda, from where one spur would lead north along Main Street just east of the Naval Air Station to connect with the Grove-Shafter Freeway (Route 24). The other spur would proceed in a southeasterly direction from the offshore distribution structure across the tidelands to Bay Farm Island and the Oakland International Airport and then connect with Route 17 (Nimitz Freeway) at approximately Davis Street in San Leandro.

The bridge structure would consist of either traffic lanes and two lanes of special transit rights-of-way. Each of the three bridge approaches (except for Hunters Point Freeway) are assumed to comprise six lanes and two special transit lanes. The transit lanes would connect to surface streets in the vicinity of the proposed Southern Crossing interchanges with existing freeways.

It further is assumed that the special transit right-of-way -- while ultimately suitable for fixed rail use -- would initially (1970-1979) have been used as exclusive lanes for express buses connecting downtown Oakland, Alameda, and the Hayward area with downtown San Francisco. The bridge approaches would have incorporated a special transit right-of-way extending to the Nimitz Freeway at Seventh Street in Oakland on the northern spur and to the Nimitz Freeway at Davis Street in San Leandro on the southern spur.

Total approximate freeway miles of construction is estimated at 4.5 miles of elevated ten-lane structure (main bridge) and 12 miles of eight-lane structure (bridge approaches, exclusive of Hunters Point Freeway).

The Hunters Point Freeway is conjectured as a new six-lane, predominantly elevated freeway constructed as an integral part of the Southern Crossing. This facility represents the southern-most bridge approach and would connect to Route 101 just south of Candlestick Park. Alignment of the freeway is assumed to follow from Route 101 across the tidelands, proceeding just east of Candlestick Park, across South Basin, and just west of the Naval Shipyard to the Southern Crossing at India Basin. Total freeway mileage would approximate 3.3 miles.

4. Likely Authority for Implementation

State of California, Division of Bay Toll Crossings, possibly in cooperation with a regional transportation agency.

5. Likely Period of Implementation

Engineering design: 1965-70

Revenue operation: 1970-75

6. Order of Magnitude Costs

Capital Cost: $350 million in 1966; $590 million in 1972. These figures include the Hunters Point Freeway, East Bay approaches, and an allowance for special transit lanes ($50 million for 1966 estimate and $85 million for 1972 estimate).

V. POTENTIAL TRANSPORTATION DEVELOPMENTS EXCLUDED FROM THE GNBA

This section documents potential GNBA components which, after technical definition and evaluation for viability in the context of the assumed decisional environment of the Bay Area (without BART), were excluded from the GNBA as a transportation system. Appendix A describes the methodology which narrowed the list of potential GNBA. components to those evaluated in this section and the previous one. Table III-1 summarizes the characteristics of all components which were fully defined in our evaluation.

Each of the potential components in this section has been defined to the same level of detail as those in the previous section. While the components can be described in technical detail, as we mentioned earlier, the principal basis for the exclusion from the GNBA of components described here is appreciation of the political and financial environment at the time of likely implementation a subjective judgment dependent upon our policy assumptions of the historical decision environment. The policy assumptions which describe the No-BART scenario, and which have determined the dichotomy between the components contained in the previous section and this one, were developed in the Section I.

Appendix D contains the bibliography of transportation planning documents which relate to the following components.

A. Construction of Geary Street Rail Transit Line

1. General Function

Construction of a Geary Street Rail Transit line would provide additional capacity in one of San Francisco's most heavily travelled corridors. Projections prepared in 1967 indicated a rail-line transit demand for 1975 of approximately 110,000 average weekday trips in this corridor. Together with the Potrero-McLaren Park areas, the Richmond District remains one of the major residential areas in San Francisco that are unserved by rail transit. The Geary Rail Transit Line would serve predominantly subregional travel although a future potential extension to Marin County could have been added giving the transit line a regional character.

2. Degree of Actual Planning Conducted

The Bingham Report of 1949 recommended a subway rail along O'Farrell and Geary Streets to Park Presidio Blvd. with a future extension to 48th Street. Considerable and serious planning has been conducted since; all proposals follow generally the same alignment from the Richmond District to Market Street. From Market Street, previous recommendations vary as follows:

- extension along Columbus Avenue
- crossing of Market Street and southerly extension along 3rd Street
- stub-ending of the rail line at Market Street
- circulation through downtown and connection to East Bay and Southern Pacific Terminals

From a review of these recommendations it can be assumed that the recommendations of the Northern California Transit Demonstration Project represent most closely the most likely alignment for this GNBA component. It is assumed that the first-stage construction (prior to 1974) would have consisted as subway between Market Street and Park Presidio Boulevard and that the remainder of the line would have operated in surface mode.

3. Physical Description

The Geary Street line would have been represented by the following characteristics:

- Construction of a partially grade-separated express streetcar line (2 tracks) along Post Street and Geary Boulevard between Market Street and 45th Avenue in the Richmond District.
- Construction of an underground terminal and transfer facility at Post and Market Streets.
- Construction of a yard facility at an undefined location along the outer Geary Boulevard.
- Provision of 8 subway stations excluding the Post and Market Street transfer station.
- Total length of facility: 6.5 miles; in subway between Market Street and Park Presidio Boulevard (4.2 miles) and in surface operation from Park Presidio Boulevard to 45th Avenue (2.3 miles).

4. Likely Authority for Implementation

Muni is the likely authority for implementation.

5. Likely Period of Implementation

Serious planning of this potential component would have taken place 1960-70. The revenue operation could have been implemented 1970-1975.

6. Order-of-Magnitude Costs

Capital costs of this potential component amount would be $276 milliion (1974) with an annual operating cost of approximately $20 million (1974).

7. Evaluation of Viability in GNBA

A number of considerations would argue for the implementation of a Geary Street rail line as an extension of Muni. Conceptually, it has been considered since 1915 and would provide a logical expansion of Muni's transit network. Even now, considerable study has been undertaken of this rail expansion. Symbolically, however, planning for the extension is being undertaken jointly with BART's planning staff.

The history of planning a line in this corridor responds to the high travel demand which exists. There is little doubt that, given the availability of sufficient capital funds, this corridor would be served by Muni rail service. Consideration of this system component as part of the GNBA was partially stimulated by the possibility of including construction of the rail line in the highway improvements which have been undertaken in the Geary corridor in the past decade. Despite the planning undertaken, and the evident travel demand, it seems unlikely that construction of the Geary Street rail transit line by Muni would have occurred in a No-BART environment.

Implementation of the Geary Street transit line would require an instigator. The Muni management, however, has not had the reputation of an aggressive innovator or growth-oriented force during the past twenty years. It is unlikely, even in the absence of BART, that the expansion posture of Muni would have been substantially different from that which occurred. In fact, it might be argued that BART inspired an impetus to change at Muni, rather than rechanneling interest in transit improvements.

Additionally, a large proportion of Muni rolling stock, particularly the PCC streetcars, were approaching the end of their useful life in the late 1960's and early 1970's. The internal priorities of Muni would have militated in favor of capital expenditures for replacement of operating equipment and for renovation of the intra-structure of the system, rather than expansion. In view of voter disinterest in funding Muni improvements, reflected in the 1967 bond issue failure, the replacement priorities could have been exclusive. Although federal funds might have been available for the capital costs of the Geary line extension, the capability for a strong grant advocacy is not apparent at Muni, nor necessarily conceivable. Efforts that have been made in that area since 1970 have been focused on the essential priorities of level of service and existing system upgrading.

B. Preferential Bus Lanes on East Bay Arterials and Freeways

1. General Function

Preferential bus lanes on East Bay arterials and freeways could provide low-capital cost and short-range improvements for transbay and East Bay transit users in the hope of ultimately affecting the model split between auto and transit.

2. Degree of Actual Planning Conducted

Little formal planning for such improvements has been conducted. Exclusive bus lanes on East 14th Street in Oakland were at one time considered but not implemented due to general lack of congestion along this facility (through-traffic uses the parallel Nimitz Freeway). Without BART, there is some likelihood that preferential bus lanes might have been implemented as a result of generally greater congestion and of a need to provide faster transit service between East Bay communities.

3. Physical Description

Increased demand in East Bay travel corridors could have resulted in initiation of preferential bus lanes (peak periods only) on the following facilities:

- Arterial Streets:	Using tow-away lanes (curb lanes) on: -Broadway, Oakland from 7th St. to Grand Avenue -E. 14th Street, Oakland, from High Street to 14th Avenue
- Freeways	On approaches to Bay Bridge only: -MacArthur Freeway (I-580) from Route 24 interchange to the toll plaza. -On East Shore Freeway (I-80) from Powell Street to the toll plaza.

The freeway preferential bus lanes would have been operated as an extension of the toll plaza exclusive bus lane. With increasing congestion in the toll plaza funnel an appropriate extension of the bus lane throughout the bottleneck would appear as a logical next step.

It is likely that preferential bus lanes on major arterial streets would have been operated during both a.m. and p.m. peak periods in the prevailing peak direction. Preferential bus/car pool lanes on the Bay Bridge approaches would need to be operated only during the morning peak period in the westbound direction.

4. Likely Authority for Implementation

CalTrans, Division of Bay Toll Crossings, City of Oakland (on Arterial Streets) would have been the most likely authority for implementation.

5. Likely Period of Implementation

1970-75 was the likely period of implementation.

6. Order-of-Magnitude Costs

The order-of-magnitude costs were negligibly small.

7. Evaluation of Viability in GNBA

Preferential bus lanes in East Bay arterials and freeways are an easily implemented device for mitigating congestion. While the costs are negligible, the motivation to manipulate modal split toward transit was not apparent prior to the 1970 to 1975 period. Even during this recent period, little formal planning for such improvements has been conducted. The natural point at which preferential treatment of buses would occur is the toll plaza, where in fact it has been implemented. To assume an extension of that preferential treatment into the approaching freeways and the arterials of the East Bay cannot be documented from either transportation planning or strong public pressures.

C. Completion of Grove Shafter Freeway (Route 24)

1. General Function

The Grove Shafter constitutes an essential link in providing highway access to the Nimitz Freeway from I-680 and the northeast.

2. Degree of Actual Planning Conducted

The alameda County Highway Master Plan of 1969 proposed the connection of the Grove Shafter to the Nimitz Freeway. Currently, the freeway terminates at 18th Street in downtown Oakland pending lawsuits on relocation housing. Right-of-Way between 18th Street and Nimitz Freeway has partially been acquired and cleared.

3. Physical Description

Alignment would be between Bush and Castro Streets in Oakland over a length of approximately 0.7 miles. Assumed cross section: three lanes in each direction without special transit right-of-way.

4. Likely Authority for Implementation

The likely authority for implementation would have been CalTrans, Division of Highways (State Route).

5. Likely Period of Implementation

1970-75 would have been the likely period of implementation.

6. Order-of-Magnitude Costs

Capital cost of this potential component amount would have been $17 million (1959 estimated adjusted to 1965-70).

7. Evaluation of Viability in GNBA

The completion of the Grove-Shafter Freeway in downtown Oakland has the highest priority among highway programs for both the City of Oakland and the County of Alameda. These priorities are honored in the funding program of CalTrans. A financial constraint then, is not an issue. By the same token, the political environment is not a cause for the delay in Route 24's completion.

The right-of-way has been acquired and the freeway would have been completed if there had not been a lawsuit concerning relocation of housing provisions of families relocated by the construction. Construction will begin upon settlement of the lawsuit concerning the relocation of families whose homes were destroyed; however, settlement is not expected prior to 1975. The No-BART scenario has no implications for this development.

D. Completion of Hegenberger/73rd Avenue Expressway

1 General Function

This facility would provide an important cross-connection between Oakland International Airport, Nimitz Freeway and Warren/MacArthur Freeways. Its main purposes would have been to relieve congestion on local arterial streets, to improve circulation in the Oakland-San Leandro subregion, and to provide needed access to the expanded Oakland Airport and to the new commercial developments that have occurred in the Nimitz Freeway area of this corridor.

2. Degree of Actual Planning Conducted

Implementation of this facility was proposed in the Alameda County Highway Master Plan of 1959. Since then detailed engineering alignment and design plans were prepared and several sections of the expressway have actually been implemented or are under construction. Construction completion for the segment from the airport to MacArthur Boulevard is scheduled for late 1974 or early 1975. The segment between MacArthur Boulevard and MacArthur Freeway (I-580) has been delayed until 1980 or later due to high costs of right-of-way and construction and due to lack of funding.

3. Physical Description

The alignment and cross section would have been as currently implemented and planned. The new expressway would connect Oakland International Airport with Nimitz Freeway, and continue via 73rd Avenue to MacArthur Freeway. The total length would approximate 4.3 miles, with the width varying between 3 and 4 lanes per direction depending on the need and spacing of intersections. The facility would be at grade with signalized intersections at major cross-streets and would be built to expressway design standards rather than freeway standards.

4. Likely Authority for Implementation

The City of Oakland would have been the likely authority for implementation.

5. Likely Period of Implementation

The segment west of MacArthur Boulevard would most likely have been implementated in the years 1970-75. The segment east of MacArthur Boulevard would most likely have been implemented after 1980.

6. Order-of-Magnitude Costs

Capital cost of this potential component would have been in excess of $5 million (at 1974 cost levels, exclusive of segment east of MacArthur Boulevard).

7. Evaluation of Viability in GNBA

While the segment of this planned expressway which lies west of MacArthur Boulevard will be completed by 1975, the eastern segment of Hegenberger Expressway (between MacArthur Boulevard and I-580) does not warrant sufficient priority to be completed prior to 1980 due to a lack of funding. The expressway is being financed solely from City of Oakland and County of Alameda gas tax funds. Implementation and funding have been unrelated to the impacts of BART.

Federal funding (FAU funds) will be sought for the construction of the eastern segment between MacArthur Boulevard and I-580. Adequate funding is not assured given the constraints on the availability of Federal funds and this segment carries a relatively low priority.

E. Extension of Route 92 to Route I-580 (Jackson Street Freeway)

1. General Function

This extension of Route 92 would provide a freeway connection between the San Mateo Bridge and Highway I-580. Current traffic between the two regional freeways uses primarily local streets adding to congestion on those arterials (Jackson Street, Hesperian Boulevard, A Street). This facility would improve primarily regional traffic circulation and complement the existing freeway network.

2. Degree of Actual Planning Conducted

Implementation of this extension was recommended in the Alameda County Highway Master Plan of 1959. During the past years, the bridge approaches east of Hesperian Boulevard have been improved. A Route 92/Hesperian Boulevard grade-separated interchange is currently under construction. Projections of 1980 demand prepared in 1959 called for about 25,000 ADT volume.

3. Physical Description

This segment would involve construction of a six-lane freeway facility to connect the San MAteo-Hayward Bridge with Route I-580 in Castro Valley. The alignment would follow from Route 92 at Hesperian Boulevard along W. Jackson Street, then proceed just south of Orchard Avenue, south of Hayward High School, and connect to I-580 at approximately Crow Canyon Road. The total length would approximate 4.8 miles.

4. Likely Authority for Implementation

CalTrans, Division of Highways (State Route) would have been the most likely authority for implementation.

5. Likely Period of Implementation

Due to lack of funding this component would not have been implemented before 1980.

6. Order-of-Magnitude Costs

Capital cost of this potential component would have been $21 million (1959 estimate adjusted to 1965-70).

7. Evaluation of Viability in GNBA

The priority for the extension of Route I-92 to I-580 comes from the State. There are two reasons, however, that the construction has not occurred. The first is the reduction in available construction funds, particularly insofar as this connection competes directly with other potential uses of funds such as the Grove-Shafter completion, Route 4, and Doyle Drive. With the increasing costs of highway construction and the limited sources of funds, and lack of total public support, completion of this link has been placed in question.

In addition to funding, a lawsuit in the City of Hayward concerning the relocation housing provided for displacement of families by construction of Route 238 has delayed completion of that route. Yet, without the completion of Route 238, the effect of an extension of I-92 is diminished; hence, the priority placed on the programming of this extension suffers. These events are independent of BART, and thus are assumed to have occurred in the absence of BART.

F. Hoffman Expressway (Route 17)

1. General Function

Improvements to Hoffman Boulevard would provide for continuity of travel in the region and provide a needed circumferential route within the Richmond area. The existing arterial streets experience a relatively high amount of truck traffic due to the predominantly industrial and warehousing land uses along this route. The assumed expressway would partly "replace and supplement the existing arterial, reduce the high incidence of accidents and relieve or forestall congestion." Similar to the extension of Route 92 to I-580 in Hayward, the Hoffman Expressway would have supplemented the existing freeway network and improve its utilization.

2. Degree of Actual Planning Conducted

Plans for Hoffman Boulevard freeway or expressway connection to I-80 were part of the overall planning for the Richmond-San Rafael Bridge. The 1957 Highway Master Plan for Contra Costa County recommended the construction of a Hoffman Freeway as a six-lane facility. During 1965-1970, Hoffman Boulevard was rebuilt as an expressway between the University of California Richmond Field Station and Highway I-80 at the Alameda County line. The remaining section currently exists as four-lane arterial street.

3. Physical Description

The Hoffman Boulevard improvement would entail construction of a four to six lane expressway facility to connect the Richmond-San Rafael Bay Bridge with Highway I-80. The facility would meet expressway standards, not fully grade separated, with possible future conversion to freeway standards (beyond 1980).

The alignment would follow from Garrard Boulevard in Richmond (end of current bridge approach) along West Cutting Boulevard to near 10th Street, then southeasterly along Hoffman Boulevard to join the completed Hoffman Boulevard Expressway near the U.C. Richmond Field Station. Additional miles of expressway construction would total three miles with at-grade crossings for major arterial streets.

4. Likely Authority for Implementation

CalTrans, Division of Highways (State Route) would have been the likely authority for implementation of this component.

5. Likely Period of Implementation

This component would not have been implemented before 1980 due to lack of funding.

6. Order-of-Magnitude Costs

Capital cost of this potential component would have been $5 million (1957 estimate, adjusted to 1965-70).

7. Evaluation of Viability in GNBA

Hoffman Boulevard has been fully engineered as a four lane freeway. The route was adopted in the early 1950's and design hearings were held between 1965 and 1970. Thus, the momentum for completion has occurred, and there has been no public controversy over Hoffman Boulevard's improvements. Locally, there is government support for the upgrading of Hoffman Boulevard. In addition, Senator Knox introduced a Bill which established top priority for these improvements, with construction to commerce in 1977, assuming the availability of funds.

With no opposition and full local support, the absence of funds becomes the relevant constraint. Since BART is not assumed to have had a major impact on the availability of highway funds, the conclusion on Hoffman Boulevard is not assumed to have been different in a non-BART scenario.

APPENDIX A

THE METHODOLOGY FOR FORMULATING A GENERALIZED NO-BART TRANSPORTATION ALTERNATIVE

If BART had not been proposed and implemented, the Bay Area's transportation need would have been met by some other form of transportation developments. The Generalized No-BART Alternative (GNBA) attempts to define the alternatives judged most likely to have occurred in the BART counties by Fiscal Year 1976 in the absence of BART.[1] Moreover, it is assumed that alternative planning commenced in 1952; the scenario is defined by the absence of BART, not the failure of BART at the polls in 1962.

The identification of the system of transportation alternatives which would comprise the GNBA involves evaluation of the physical or service elements of transportation systems which might have been feasible for implementation prior to Fiscal Year 1976 in terms of technology, financing, political acceptability, and the timing of implementation (given realistic consideration of the requirements of planning and construction, as well as equipment availability).[2]

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[1] See "Methodological Approach for Defining the Generalized No-BART Alternative (GNBA)," a BART Impact Working Paper by Stephen Rosenthal, October 15, 1974.

[2] The BART Impact Program has established the research that the GNBA be in place and operating by Fiscal Year 1976. Unfortunately this unrealistic criterion eliminates from the GNBA system components which might have been planned for implementation, post-197 thus influencing the composition of the Bay Area's in-place transportation system. This shortcoming is even more emphatic since BART will not be fully operational by the start of Fiscal Year 1976.

A. The Identification of Potential GNBA System Components

The process by which the GNBA was formulated commenced with the identification of potential system components for all of the major travel corridors in the San Francisco Bay Area, including both BART and non-BART counties. This first stage of the formulation process was based upon transit planning and engineering considerations, not political feasibility. The potential components, consisting of alternatives which may or may not have received actual planning consideration over the past two decades, responded to two preliminary criteria: first, the component was technologically feasible and, second, it represented an increase in travel capacity (i.e., it was not merely an improvement to travel comfort).

Potential system components formulated on this basis were reviewed by the BART Impact Program and the Metropolitan Transportation Commission for:

- Completeness: Has consideration been given to all of the plausible transportation developments that could have occurred had BART not been implemented?

- Conceivability: Are any of the considered developments so unlikely (i.e., inconceivable) that there is no value in their further analysis? (To eliminate a potential component required concensus of all participants in the review process, based on a judgment of inconceivability considering financial viability, implementation timing, and political acceptability.)

Only one major qualification was placed upon the potential components at this stage: all BAPT-like components were eliminated as inconsistent with the BART Impact Program's research objectives. Thus, a minimum BART plan, the reinstitution and possible extension of the Key Transit System, and the introduction of a light-rail transbay system, all considered potential components by the consultant, were eliminated from consideration in the GNBA by the BART Impact Program.

Included within the evaluation of a hypothetical system of transportation developments was consideration of which transportation developments in BARTD counties were actually BART-stimulated, though not part of the BART system (Table A-1). Without BART, the GNBA might have excluded certain non-BART developments, such as the improvement of Market Street in San Francisco. Thus, the GNBA formulation included both positive and negative options.

B. Evaluation Against Preliminary Political and Planning Viability Criteria

The list of potential system components (Table A-2) was then evaluated by the consultant against ten general criteria in order to group components concurrently into subsystems while eliminating components that general research indicated did not warrant continuec study. This process of elimination was based upon review of each component against a range of preliminary criteria.

General criteria were established which would permit a preliminary evaluation of the viability of potential components, considering

TABLE A-1

BART-STIMULATED TRANSPORTATION DEVELOPMENTS IN BART CORRIDORS[1]

BART Corridor	Transportation Development
San Francisco	1. Upgrading of streetcar lines (especially Market Street subway)
	2. Conversion of Market Street to transit street
Southern Alameda/ Oakland	1. Expansion and improvement of A.C. Transit (increased public demand for transit service and willingness to provide tax support due to BART's public information program on transit needs)
	2. Local street improvements in station vicinities
	3. BART feeder service: express bus Livermore, San Jose-Fremont
Berkeley-Richmond	1. Expansion and improvement of A.C. Transit
	2. Reconstruction of Shattuck Avenue
	3. Local street improvements in station vicinities
Central Contra Costa County	1. Local street improvements in station vicinities
	2. Route 24 expanded by one lane in each direction
	3. BART feeder service: express bus Pittsburg-Antioch

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[1] These transportation developments might not have occurred without BART's implementation.

Source: McDonald & Smart, Inc.

both attributes which would favor implementation and those which militate against a component's having been implemented. Some of the criteria include considerations which have been implicit to the transportation planning process, e.g., does it increase travel capacity? The preliminary criteria, then, include:

- The environmental acceptability of implementation of the transportation development at the time of system planning and implementation.

- The extent of neighborhood disruption which would result from implementation of the transportation development. This criterion provides the impetus for the most vocal public (hence, local political) reaction to transportation developments.

- The capability of the transportation development to increase the capacity of the system serving the entire region. (Purely local capacity improvements are not considered relevant to the alternative to BART, which is an interurban express system.)

- The impact on modal split toward transit which the transportation component might induce. This is a reasonably important consideration given the BART objectives, presumably reflective of the demand on transportation planners, of transporting commuters rapidly while alleviating congestion.

- Convenience, including consideration of increased accessibility for portal-to-portal operation, comfort, and speed.
- The perceived congestion relief related to the implementation of a potential component.
- The flexibility to serve new growth. This criterion provides a measure of the ability of a transportation system to serve new growth if growth occurs independently of transportation developments.
- Capital cost.
- Operating cost.

This general review of the relevance and viability of potential components is summarized in Table A-2.

C. The Elimination of Non-Viable Components from the GNBA

To limit research to the definition of viable alternatives to BART, a number of components were eliminated after preliminary review. The preliminary general tests of viability, political and planning, affected a number of potential components.

At this point, an important element of viability related to the actual extent of planning which transportation decision-makers had conducted on a proposed component either pre-BART or during the BART period. The importance of transportation planning as a criterion for GNBA viability recognizes the initiative for and

TABLE A-2

ALTERNATIVE GNBA SUBSYSTEMS EVALUATION

BART Corridor	Candidate GNBA System Component Key H = High L = Low	1. Environmental Acceptability	2. Capability to Induce Growth	3. Neighborhood Disruption	4. Capability to Increase Capacity	5. Impact on Modal Split	6. Convenience (Accessibility, Speed, Comfort)	7. Perceived Congestion Relief	8. Flexibility to Serve New Growth	9. Capital Costs	10. Operating
San Francisco	Upgrading of existing streetcar lines	H			L	L					
	Expansion or retention of streetcar system										
	- Geary Street	H		L	L	H	H	H		H	L
	- Mission Street	H		L	L	H	H	H		H	L
	Exclusive or preferential bus lanes on freeways	H			L	H	L	L			
	Increased frequences of bus system					H	H		H	L	H
	New freeways										
	- Panhandle	L	L	H	H		H	H		H	
	- Golden Gate (Marina)	L	L	H	H		H	H		H	
	- Bay Front (San Mateo County)	L	L	H	H		H	H		H	
	New expressway - Hunters Point	L	L	H	H		H	H		H	
	Expanded jitney system on Mission Street	H				L			H		
	S.P.R.R. access to downtown	L		H		L				H	
Transbay (Bay Bridge)	Exclusive bus lanes	H			L	H	L	L		H	
	Reinstatement of ferry service										
	- Oakland	H				L				H	L
	- Berkeley	H				L				H	L
	Southern Crossing with bus provision	L	H	H	H	L	H	H		H	
	Preferential treatment of car pools					L					
	Traffic engineering improvements					L		L			
Southern Alameda-Oakland	Increased bus service										
	- Arterial streets	H			L	L			H	L	L
	- Nimitz Freeway (Route 17)	H			L	L				L	L
	- MacArthur Freeway (I-580)	H			L	L				L	L
	- Grove-Shafter (Route 24)	H			L	L				L	L
	Exclusive bus lanes										
	- Arterial streets	H			L	L	L	L	H		
	- Nimitz Freeway (Route 17)	H			L	H	L	L			
	- MacArthur Freeway (I-580)	H			L	H	L	L			
	- Grove-Shafter (Route 24)	H			L	H	L	L			
	Bridge approaches to Southern Crossing										
	- Grove-Shafter Extension	L	H	H	H		H	H		H	
	- Alameda to Route 17	L	H	H	H		H	H		H	
	Southern Extension to I-580 (MacArthur Freeway)	L	L	H	H		H	H		H	
	Hegenberger Expressway	H	L	H	L			H		L	
	Extension of Route 92 to I-580	H	L	H	L			H		H	
	Grove-Shafter Freeway	L	L	H	H		H	H		H	
Berkeley-Richmond	Increased express bus service on										
	- Arterial streets	H			L	L			H	L	L
	- Eastshore Freeway (I-80)	H			L	L				L	L
	Exclusive bus lanes on										
	- Arterial streets	H			L	L	L	L	H		
	- Eastshore Freeway (I-80)	H			L	H	L	L			
	Hoffman Boulevard as expressway (Route 17)	H	L	L	L			L		L	
	Hoffman Boulevard as freeway (Route 17)	L	L	H	H			H		H	
Berkeley Hills (Caldecott Tunnel)	Exclusive bus lane through tunnel or on approaches	H			L	H	L	L			
	Increased Greyhound bus service					L			H	L	H
	Replacement of Greyhound by A.C. Transit service					L			H	L	H
	Preferential treatment of car pools					L					
	Shepherd Canyon Freeway, I-680 to Warren Freeway	L	H	H	H		H	H		H	
Central Contra Costa County	Increased Greyhound bus service					L			H	L	H
	Extension of A.C. regional service					L			H	L	L
	Extension of A.C. local service										
	- Fixed routes					L			H	L	L
	- Dial-a-ride					L			H	L	L
	Exclusive bus lanes on Route 24	H				L	L	L			
	Route 24 freeway with transit median	H				L		L			
	Route 24 with six lines instead of eight	L									
	New freeways										
	- Shepherd Canyon Freeway	L	H	H	H		H	H		H	
	- Ignacio Valley Freeway	L	H	L	H		H	H		H	
	- Route 4 completion (John Muir Parkway)	L	H	L	H		H	H		H	

substance of most transportation developments originates within the transportation planner's domain. BART is a notable exception. Most improvements to transportation capacity, however, would be initiated by planners whose professional responsibility is to identify and define alternative approaches to satisfying transportation demand. The planners, in this context, include the transportation planners of the Department of Highways, the planners of private transit companies, the senior engineers of the Division of Bay Toll Crossings, the city planners of San Francisco, et al.

Only after the transportation planners had proposed a development would other influence groups reinforce or deter the progression toward implementation. Hence, except in cases where the decision history of BART provides compelling evidence that a transportation development would have been initiated by an interest group other than the transportation planners in a No-BART scenario, the extent of actual consideration or planning undertaken is deemed an important signal of GNBA viability. This is particularly true of transportation developments of a discrete nature which require considerable prior planning, such as a new transit system or a freeway, rather than developments of an incremental nature, such as increased service or expanded lane capacity.

The reasonability of this test is particularly persuasive in determining the viability of potential GNBA components which would serve transit demand not presently served by BART, i.e., testing the likelihood of transportation developments such as expanded Muni service or a Mission Street streetcar line, neither of which is competitive with BART. Thus, the transportation planners would have been investigating alternatives for providing transit demand with or without BART.

The following components were eliminated as non-viable:

- While expansion or retention of a streetcar system on Market or Mission Street in San Francisco might have been an element of a non-BART light-rail system, no serious planning has been conducted on this alternative as an isolated transportation development. BART-like light-rail systems have been precluded from consideration by program requirements. On the other hand, no serious planning consideration has been given to the Mission Street route except in the context of a rapid transit system for San Francisco. Our research has not indicated it was ever seriously considered as part of a local feeder service or extension of Muni service. Without the City's or Muni's impetus, it is unlikely it would have been developed.

  The lack of official interest in this alternative was evident even in the City's long-term transportation planning. In the "Transportation Technical Committee Report" of May, 1960, which advised the Mayor's Transportation Council on recommended rapid transit routes to complement BART, it was recommended that the Market Street line be deferred since the report considered it to be the least essential element of the proposed expansion.

- The three potential new freeways within the San Francisco Corridor -- the Panhandle, the Golden Gate (Marina), and the Bay Front (San Mateo County) -- were eliminated based upon the criteria of outspoken and demonstrated public environmental concerns and reaction to neighborhood disruption. Implementation of those freeways has not occurred during the past 20 years despite extensive planning. Since these highways do not serve the same travel demand as BART, the deferral cannot be linked to BART's development of alternative capacity.

  The history of public obstruction of highway development in San Francisco, exemplified by the Board of Supervisors' "Freeway Revolt Resolution" in 1959 prohibiting all freeway construction within the City, including the termination of construction on the Embarcadero Freeway, provides a persuasive basis for the elimination of these freeways from the viable alternatives to BART.

- The Southern Pacific Railroad access to downtown was eliminated because of the documented public reaction to environmental and neighborhood disruption considerations in downtown San Francisco (freeways and Yerba Buena), complemented by the absence of Southern Pacific motivation for implementation. Furthermore, the Southern Pacific extension has not occurred to date despite the fact that BART does not compete with any planned extension. Indeed, an interface with BART may even be a more compelling argument for the extension than would occur in BART's absence. Finally, land values in the area of the railroad station have increased sufficiently to make consideration unrealistic to private enterprise.

- In the transbay corridor, the reinstatement of ferry service from Oakland and Berkeley to San Francisco has been eliminated because of the marginal impact ferry service would have upon total transportation capacity, because of the relatively low convenience factor considering portal-to-portal requirements, and because of its relatively low cost/benefit relationship. Furthermore, without a strong champion of reinstatement and, presumably, the allocation of toll revenue from the Bay Bridge, it is unlikely that ferry service would have been implemented. While some impetus for implementation is evident in Emeryville's consideration of introducing ferry service to San Francisco, the service still will not be in operation by Fiscal Year 1975, the time frame of the GNBA.

- In the southern Alameda/Oakland corridor, the exclusive bus lanes on the Nimitz Freeway (Route 17) were eliminated from consideration because of the considerable commercial traffic presently utilizing the Nimitz which discourages any reduction in the number of automobile and truck lanes. It would be more likely that the exclusive bus lanes along that Route would occur on the arterial streets parallel to the Nimitz Freeway except in the approaches to the Southern Crossing bridge , if it had been built.

- The southern extension of I-580 (MacArthur Freeway) in the southern Alameda/Oakland corridor was eliminated on the belief of the adverse community disruption and environmental concerns. In light of these concerns, and the relative magnitude of the impacts which would have stimulated these reactions, the southern extension was considered political unviable.
- In the Berkeley-Richmond corridor, Hoffman Boulevard was eliminated as a freeway component, although it was further considered as a potential element of the GNBA as an expressway. The differentiation may be merely semantics, since the freeway concept of limited access still is espoused by planners, if only in the diminutive form of a four-lane freeway. The four-lane limitation is based on an assessment of financial constraints within the Division of Highways. Retention of Hoffman Boulevard improvements among the final components considered is based upon Assemblyman Knox's recent legislation establishing a mandated priority for those improvements (given funding) and the clear economic demand for Hoffman Boulevard improvements if the Port of Richmond is to become an economic enterprise. Hoffman Boulevard, after all, provides primary access to the Port. Thus, while freeway improvements to Hoffman Boulevard have been deemed non-viable, improvement of the highway to a limited four-lane expressway capacity have been considered viable.
- The Shepherd Canyon Freeway was eliminated because of low priority in state planing; this freeway always has had

greater local support than state support, a condition which does not expedite the allocation of state funding for implementation. Nonetheless, the state highway plan, adopted between 1955 and 1960, identified the Shepherd Canyon Freeway as a component, leading to some preliminary right-of-way acquisition for "hardship and protection of the corridor."

The low priority of this freeway is evident in the little serious planning undertaken by the state for this route, even in the late 1950's. Although the Shepherd Canyon Freeway could have been considered a logical alternative to the Caldecott Tunnel, there is no evidence that planners were focusing on this alternative. It did not even become a part of the Division of Highways' program, which provides the implementation schedule for the Highway Plan.

- In the Berkeley Hills corridor, preferential treatment of car pools is not considered a realistic component of the GNBA since the congestion problem at the Caldecott Tunnel is not projected as sufficiently severe to warrant its introduction (based upon initial travel demand estimates for the corridor in the GNBA scenario).

- In Central Contra Costa County, the extension of A.C. Transit local service on both fixed routes and dial-a-ride was eliminated, based on insufficient demand. Fixed route extension of local service was defeated by the electorate in November, 1974, emphasizing the lack of interest in local service despite enthusiastic support (through taxing processes) of a strong line-haul service. This is not surprising in a county in which over 70% of the households have two or more cars. Dial-a-ride, as a comprehensive local service feature, has been eliminated from consideration in the GNBA on the basis of high cost of operation and a minimum impact on overall regional transportation requirements.

- Route 24 as a freeway with a transit median was eliminated in the Central Contra Costa Corridor because of the high expense of providing transit capability in the median, an expense not likely to be borne in the absence of a capital-intensive BART-like system. The alternative of exclusive bus lanes on Route 24, which has been further defined in the GNBA evaluation, considers the potential for bus operation either in the median or within the right-of-way.

- The Ignacio Valley Freeway was eliminated from the Central Contra Costa Corridor because it was never considered seriously enough by highway planners to become part of the CalTrans Planning Program. The CalTrans Division of Transportation Planning considered the Ignacio Valley Freeway as sheer speculation as a transportation development. The planning process had never progressed to the point of determining how the freeway would penetrate the Kirker Pass.

D. Definition of GNBA Components as Subsystems

The potential GNBA components which warranted further evaluation were grouped into related subsystems, based primarily upon the homogeneity of their transportation functions. The Southern Crossing, and all of its approaches, for instance, were consolidated into a single transportation subsystem based upon its regional transportation system function rather than isolating each component by geographic location. Similarly, increased bus service in the East Bay, regardless of corridor, was grouped as a single GNBA subsystem development.

The subsystems were subjected to more refined definition, including:

- The general physical location, dimensions and size, and operating characteristics of each subsystem.
- The degree of actual planning which has been conducted on each component.
- The reasons for historical postponement or rejection of implementation of the component, despite actual planning.
- The capital and operating cost estimates for the recommended components, derived from published sources or prepared by Peat, Marwick & Mitchell.
- The financial implications of alternative system implementation, including a general review of potential sources of funds which would have been available at the time of implementation during the past 20 years.

- A general evaluation of the degree to which the subsystem might influence shifts in population location.
- The likely timing of implementation and the authority which would be responsible for implementation of the transportation development.

These criteria describe the framework within which the subsystems were evaluated for viability in terms of political realities, the timing of implementation, the available funding, and the bureaucratic and popular influences promoting or deterring implementation. This evaluation of the GNBA subsystems' individual and collective viability is a judgment based upon the time-sequenced policy assumptions contained in this report.

E. Evaluating the Integrity of the GNBA

The final evaluation of the system comprising the GNBA involves an assessment of the aggregated system of transportation developments and its associated funding implications. In essence, the final evaluation is a reasonability test of the proposed GNBA.

The complete GNBA transportation system must relate to the capacity requirements of the BART counties in the Bay Area. It is assumed that the planning process will strive toward meeting projected travel demand for Fiscal Year 1976 in each of the major transportation corridors.

The aggregate funding requirements (sources and amounts) must be consistent with the time-sequenced general policy assumptions regarding funding availability.

The implementation schedule for each of the GNBA transportation system components must seem orderly, consistent, and feasible.

The hypothetical GNBA transportation system, taken as a whole, must appear compatible with the actual experience of other comparable metropolitan areas and non-BART counties in the Bay Area. These developments are reviewed in Appendix B.

APPENDIX B

TRANSPORTATION DEVELOPMENTS IN THREE NON-BART COUNTIES: MARIN, SAN MATEO, AND SANTA CLARA

The determination of a Generalized No-BART Alternative requires an evaluation of all possible alternative transportation system components, in the context of key policy assumptions concerning the Bay Area political and financial environment during the period of BART's development. A measure of the reasonableness of the GNBA would involve, ideally, a control case -- a comparable physical, economic, and political environment in which a high technology regional rapid rail system was not proposed or developed. Unfortunately, the control case does not exist.

Nonetheless, a comparison can be made among the transportation developments which have occurred during the past 20 years in three Bay Area counties which have similar growth, population, and economic patterns to the BART counties but which have not implemented a regional rapid transit system -- Marin, San Mateo, and Santa Clara counties. Although each of these counties was considered part of BART's service area, for various reasons -- documented elsewhere -- each county subsequently was eliminated from the system's Phase I plan.

By evaluating the type and extent of actual transit and highway improvements in these areas, comparisons can be drawn as to likely transportation developments that could have occurred in San

Francisco, Alameda, and Contra Costa counties had BART not been built.

The GNBA in non-BART counties is essentially a description of the actual transportation developments of those counties, although improvements in the non-BART counties which might have been implemented in anticipation of BART service in the BART counties or as a result of generally greater public and political awareness of transit due to BART have been excluded. The GNBA for Marin, San Mateo, and Santa Clara counties is summarized in Table B-1.

Both actual transportation developments during 1962 to 1974 and developments currently programmed for implementation by Fiscal Year 1976 have been included in the GNBA. Within each county, the developments are grouped by major travel corridor. Since emphasis in this analysis is placed on line-haul transportation elements, rather than on local or distribution systems, only transportation developments of regional and sub-regional importance were considered for this comparison. Furthermore, the review was limited to transportation developments that represented an increase in travel capacity. This eliminated institutional measures such as fare reductions, higher parking fees, changes in bridge tolls, and solely service-oriented developments such as the replacement of old buses by new ones.

TABLE B-1

TRANSPORTATION DEVELOPMENTS IN NON-BARTD COUNTIES: MARIN, SAN MATEO, AND SANTA CLARA, 1962-1975[1]

Corridor	Transportation Development
Golden Gate Corridor	1. Implementation of improved regional and intra-county bus system (Golden Gate Transit).
	2. Reinstatement of ferry service (Sausalito to San Francisco, Larkspur to San Francisco), "P."
	3. Reversed-traffic exclusive bus lane (US 101).
	4. Reversible-traffic lane on Golden Gate Bridge.
Marin County[2]	1. Implementation of improved regional and intra-county bus system (Golden Gate Transit).
	2. Reinstatement of ferry service.
	3. Reversed-traffic exclusive bus lane (US 101).
	4. Widening of freeway US 101.
Richmond-San Rafael	1. Initiation of regional bus service.
	2. Upgrading of Hoffman Boulevard (Route 17).
San Mateo County	1. Expansion of freeways: Route 1 (Pacifica), I-280, Route 92 (Arthur Younger Freeway), I-380.
	2. Implementation of countywide bus system, "P" (regional and local, fixed route, and dial-a-ride)
	3. Upgrading of Southern Pacific Commuter Railroad, "P."
Santa Clara County	1. Implementation and expansion of countywide bus service, "P" (regional and loca, fixed route, and dial-a-ride).
	2. Santa Clara Expressway program.
San Mateo Bridge/ Dumbarton Bridge Corridor	1. Implementation of transbay bus service between Freemont-Palo Alto-Hayward-San Mateo, "P."
	2. Reconstruction and widening of San Mateo Bridge.
	3. Reconstruction and widening of Dumbarton Bridge, "P."

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[1] Transportation developments programmed for implementation by Fiscal Year 1976 are indicated by "P."

[2] Local segment of Golden Gate Corridor.

As applicable, each actual or planned transportation element is described and assessed with respect to the following aspects:

- Physical characteristics (area covered, location, and description)
- Operation and service (days and periods of operation, service frequencies)
- Utilization (current patronage or vehicle volumes, public acceptance)
- Operating costs
- Institutional arrangements
- Fiscal and funding aspects
- Year of implementation

This review of the transportation developments that have occurred during the last decade in Marin, San Mateo, and Santa Clara counties reveals that few dramatic changes in transportation systems have occurred. In general, the transportation programs that were implemented during the 1962-1974 period followed rather conventional objectives and consisted predominantly of an expansion and improved utilization of existing transportation facilities and modes.

The two most significant developments, in terms of political complexity and increased travel capacity, were:

- The formation of a transit operating agency for the Golden Gate Corridor under the mantle of the Golden Gate Bridge, Highway and Transportation District (GGBHTD). Expanded regional and local bus transit service was introduced between San Francisco and Marin and Sonoma counties. This service was characterized by higher levels of service, including new buses and reserved bus lanes. The District also reintroduced ferry service between Marin County and San Francisco.

- Construction of a sub-regional freeway/expressway system in Santa Clara County, funded by a county freeway bond issue.

San Mateo County, on the other hand, can be considered as an example of political indecisiveness during the BART implementation period. Several attempts to obtain voter approval for a countywide transit system and an expressway system in San Mateo failed, while service and ridership of existing transit systems -- such as Greyhound and the commuter service of the Southern Pacific Railroad -- declined. The four major freeway facilities that were constructed in San Mateo County during the past decade represented important regional links planned for network continuity rather than to aid intra-county and sub-regional travel.

Perhaps two implications can be drawn from the experience of the non-BARTD counties during the period 1962-1974. As far as transit developments are concerned, there is little evidence, even in the absence of BART, that the voters were willing to fund transit systems. Naturally, BART's financial experience might have soured the populace to transit financing; however, essentially all transit improvements advocated by non-BARTD counties during BART's implementation were relatively low capital bus systems which had no need for bearing the costs of a guideway. While both Santa Clara and San Mateo have formed transit districts during the past five years, neither has been granted the authority to tax their constituents for transit improvements. In each case, the low capital system alternative has undoubtedly been the result of financing difficulties and the timing of implementation influenced by the availabilit of external financing.

Only in the past five years has adequate funding been available from federal and state sources to assist in organizing a transit district without seeking financing from the voters, largely through the Urban Mass Transportation Acts of 1970 and 1974, the Federal Aid to Highways Act of 1973, and the California Transit Development Act of 1971 (S.B. 325). This reality undoubtedly has had an impact on the nature of proposed transit systems: only a high technology, modern, and expensive system would be sufficiently attractive to gain support at the polls, and even that is not a certain victory. Thus, with two notable exceptions in the Bay Area, the non-BART systems which have been proposed or implemented have been low capital bus systems financed by sources other than the property tax.

One transit development which reinforces the agrument, to some extent, is the Golden Gate bus and ferry transit systems. These systems were placed in operation in 1971 and 1972, earlier than in other non-BARTD counties. Its ability to do so, however, was based on its own source of financing -- the toll revenue from the Golden Gate Bridge. Without this source of financing to complement federal capital funds, or with the need to go to the voters to finance the system, the success with which it was organized might have suffered some mitigation.

The other exception is within BARTD counties, Alameda and Contra Costa, where the taxpayers have been willing to fund two transit systems simultaneously and prior to sources of federal assistance. These two counties support a highly efficient bus system, A.C. Transit, which was capable of meeting the transit demand within BART's most highly traveled corridor -- transbay -- throughout the period of BART's implementation. While the absence of strong support for tax-supported bus systems elsewhere reduces the likelihood that dramatic new service expansions would occur for A.C. Transit in the GNBA, incremental increases in bus service, without BART, would undoubtedly have involved A.C. Transit as the vehicle.

Significant transportation developments which have not been related to transit include, naturally, highway and freeway improvements. The planning of state and federal routes in the non-BARTD counties as well as the BARTD counties was established in 1958; since then, annual programming of highway priorities has occurred against increasingly limited funds. The transportation planners of the Division of Highways maintain that BART has had virtually no impact on the programming priorities. The opportunity for GNBA highway programs illuminated by experience in non-BARTD counties was the county freeway bond issue as a financing approach.

While Santa Clara's bond issue is a consideration for increased highway construction in a GNBA, two qualifications should be maintained. First, San Mateo also attempted a freeway bond issue which failed before voters who were not bearing any other transportation taxes at the time. There is no proof of a different sentiment in the BARTD counties. Although Contra Costa County once considered a freeway bond issue, it never reached the ballot. The other qualification to the relevance of a freeway bond issue is the dedication of the financing to county roads. The highway facilities which might be a part of the GNBA are major trunk routes; virtually no county road improvements would fulfill the requirements of GNBA formulation.

The transportation events of the non-BARTD counties during the period of BART's implementation were mostly uneventful. Public interest in transit programs did coalesce into popular action programs which implemented even bus systems. On the contrary, there was little apparent popular willingness to pay the costs of transit. The highway developments merely sustained the earlier federal and state planning for network completion; the legislative requirement for highway fund allocations virtually prohibits major readjustments of counties' shares in response to a future transit system.[1]

Insofar as the relevance of the non-BARTD Bay Area counties as a control case is concerned, our research has not indicated that the type and mode of transportation developments in the three non-BART counties differed from what might have occurred in the BARTD counties on the basis of land use or population densities. Intrinsic factors such as political leadership and support, public and social awareness of transportation issues, and fiscal and funding questions played a much stronger role in influencing the decision process for providing transportation. But in no case was there strong impetus for anything but incremental improvements to existing systems.

A. Golden Gate Corridor

1. Implementation of Golden Gate Bus Transit

a. Physical Characteristics

The Golden Gate Bridge, Highway and Transportation District is composed of the counties of Marin, San Francisco, Sonoma, Del Norte, the majority of Napa County, and a portion of Mendocino

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[1] The state's highway budget is allocated according to a formula in which each county is guaranteed a certain amount of state highway construction expenditures during specified periods based upon percentages established in the law.

County. The District provides inter-county transit service among San Francisco, Marin, and Sonoma counties and intra-county service in Marin and Sonoma counties. The spine of the major regional service route follows US 101, connecting Marin communities with downtown San Francisco. Its predominant function is to serve the daily commuter to San Francisco.

b. Operation and Service

The Golden Gate bus transit system includes a fleet of 220 buses. Local bus service in Marin County and express service between San Francisco and the major cities in the district are provided on twenty-eight different routes. Service levels, which include 7-day service on some routes and up to 22-hour per day service, have been rated extremely high by its market share, evidenced by the high patronage levels.

c. Utilization

Weekday daily patronage across the Golden Gate Bridge in 1974 totaled 21,000 total passengers in both directions. In mid-1972, the monthly ridership on transbay routes was 345,000 persons, and another 122,000 were riding between Marin County points.

d. Operating Costs and Revenues

Total Operating Revenue, Fiscal Year 1974 (including $340,765 from charter operations)	$4,585,000
Total Operating Expenses, Fiscal Year 1974	8,808,000
Operating Deficit, Fiscal Year 1974 (48% of operating expenses)	4,222,000

e. Institutional Arrangements

The Golden Gate bus transit system is owned and operated by the Golden Gate Bridge, Highway and Transportation District, which is also responsible for the operation of the Golden Gate Bridge and the Golden Gate ferry service. The District has statutory authority to issue bonds and to collect bridge toll revenues.

f. Fiscal Aspects

For 1974, it is expected that 43% of the operating expenditures, estimated at $9 million, will be covered by fare box revenues. About 5% will be covered by property taxes ($0.05 per $100 assessed value) from the Marin County Transit District, another 5% will come from T.D.A. (S.B 325), and the remaining 47% will come from bridge toll revenues. Capital improvement costs, estimated at $3.3 million in 1974, will be covered by T.D.A. funds (40%) and by federal grants (60%). In order to cover operating deficits from its bus and ferry operation, the GGBHTD raised its round-trip bridge toll, set at $0.50 since 1955, to $0.75 per passenger vehicle in March, 1974.

g. Year of Implementation

Golden Gate bus transit commenced service on January 1, 1972. The bus system is scheduled to expand over the 5-year period through Fiscal Year 1975 by thirty additional buses to a total of 250 vehicles.

2. Reinstatement of Ferry Service: San Francisco to Sausalito and San Francisco to Larkspur (Planned)

a. Physical Characteristics

Point-to-point scheduled service is being provided between the Ferry Building in San Francisco and downtown Sausalito. Commencing in 1976, ferry service will be expanded to serve Larkspur-San Francisco from a new terminal planned to be constructed in Larkspur.

b. Operation and Service

One vessel is presently in operation providing scheduled service between San Francisco and Sausalito. In 1975, three new high speed ferryboats are planned to be operating, initially between Sausalito and San Francisco, and ultimately between Larkspur and San Francisco.

c. Utilization

The expected patronage for Fiscal Year 1974 is one million passengers. In mid-1972, the vessel was carrying an average of 91,000 passengers per month.

d. Operating Costs and Revenues

Total Operating Revenue, Fiscal Year 1974	$ 692,000
Total Operating Expenses, Fiscal Year 1974	1,218,000
Operating Deficit, Fiscal Year 1974 (43% of operating expenses)	521,000

e. Institutional Arrangements

The ferry service is owned and operated by the Golden Gate Bridge, Highway and Transportation District, which also owns and operates Golden Gate bus transit and the Golden Gate Bridge.

f. Fiscal Aspect

In 1974, it was estimated that 51% of the operating expenditures would be covered by fare revenues. Transportation Development Act funds would cover approximately 5% of operating expenses, and the remaining 44% would come from bridge toll revenues. Capital improvements were expected to be over $13 million for 1974, with federal grants covering two-thirds of the costs. Approximately one-third of the capital costs will have to be covered by bridge toll revenues.

g. Year of Implementation

The first vessel was placed in operation in August, 1970. The first of three new vessels is expected to begin operation in 1975.

3. Exclusive Bus Lane (Reversed Traffic)

a. Physical Characteristics

From the Golden Gate Bridge (but not including the bridge) to Richardson Bay Bridge on US 101, buses use an exclusive lane during the evening peak period, operated as a contra-flow lane in the northbound direction on a southbound freeway lane. Extension of the exclusive bus lane to San Rafael is scheduled for implementation shortly.

b. Operation and Service

The contra-flow lanes are in operations on weekdays only during morning and evening peak periods.

c. Utilization

In September, 1973, southbound weekday usage during the morning peak period was 170 buses containing 7,140 passengers.

d. Institutional Arrangements

The exclusive bus lane is jointly operated by the GGBHTD and CalTrans.

e. Year of Implementation

In September, 1971, there was a one-way exclusive bus lane, northbound in evening peak hour on two southbound lanes (one lane acting as a buffer).

B. Marin County Corridor (Local Segment of the Golden Gate Corridor)

1. Implementation of Improved Regional and Intra-County Bus System

The Marin County Transit District functions as a funding entity and as a planner/promoter of local transit services but not as a transit operator. Most of its property tax revenue is involved in the contracting of service from Golden Gate Bus Transit, providing Marin County with local transit service.

2. Reinstatement of Ferry Service by Golden Gate Ferry Transit

Reinstatement of ferry service in the Golden Gate Corridor was discussed in section A-2 above.

3. Reversed-Traffic Exclusive Bus Lanes on US 101

Reversed-traffic exclusive bus lanes was discussed in section A-3 above.

4. Widening of Freeway US 101

During the early 1960's, US 101 was upgraded and widened to eight lanes as part of the California Division of Highways' highway construction program. The reconstruction extended basically from the Golden Gate Bridge to Novato. Truck climbing lanes were added in the section from the Golden Gate Bridge to approximately the Richardson Bay Bridge.

5. Reversible-Traffic Lanes on Golden Gate Bridge

a. Physical Characteristics

The two center lanes of the Golden Gate Bridge are reversible according to traffic flows at peak periods. Plastic tubes inserted into the pavement to separate the two traffic flows can be changed from one lane to another.

b. Operation and Service

The six available traffic lanes on the bridge are operated in a "4 plus 2" pattern during commute peak periods and on weekends to accommodate recreational traffic flows.

c. Utilization

The average 1973 peak hour two-directional volume was 11,000 vehicles (including buses and trucks) crossing the bridge. This amounts to about 1,850 vehicles per lane per peak hour.

d. Institutional Arrangements

The exclusive lane is operated by the Golden Gate Bridge, Highway and Transportation District.

e. Fiscal Aspects

The reversible-traffic lanes on the Golden Gate Bridge are funded and operated as part of the Golden Gate Bridge operation.

f. Year of Implementation

This program was instituted in 1968.

C. Richmond-San Rafael Bridge Corridor

1. Initiation of Regional Bus Service

a. Physical Characteristics

In mid-1974, regional bus service was reactivated across the Richmond-San Rafael Bridge after 5 years without service. The bus service connects the Greyhound Bus Terminals in San Rafael and Richmond with intermediate stops at San Quentin and the Richmond BART station.

b. Operation and Service

Buses operate on 30 to 45 minute headways during peak hours and on 1 to 2 hour headways during non-peak hours (there is more frequent service between San Rafael and San Quentin during non-peak hours). Both weekday and weekend service is provided.

c. Institutional Arrangements

The bus service is operated under permit from the Public Utilities Commission (PUC) by a private owner/operator, Travelers' Transit of San Rafael. No public subsidies are being expended for this service.

d. Year of Implementation

The service commenced in 1974.

2. Upgrading of Hoffman Boulevard (Route 17)

With the purpose of providing a high-standard highway connection between the Richmond-San Rafael Bridge (Route 17) and the East Short Freeway (I-80), portions of Hoffman Boulevard in Richmond have been upgraded to an expressway facility. The improvement extends from the University of California-Richmond Field Station to the freeway interchange at Buchanan Street and consisted of widening of Hoffman Boulevard to six lanes and the elimination of grade crossings. Overall, however, this upgrading has been a rather small-scale improvement with little effect on travel conditions. Long-range plans call for a conversion of the entire connection from the bridge to I-80 -- a considerably longer stretch than what has been improved -- to expressway for freeway standards.

D. San Mateo County Corridor

1. Expansion of Freeways

a. Interstate 280

Along with US 101, I-280 is the most important link between San Jose and San Francisco, aligned parallel to US 101 on the west side of the urbanized areas. Construction of this eight lane facility was completed in December, 1973.

b. Route 1

Route 1 is a state highway along the coast, linking Half Moon Bay, Pacifica, Daly City, and San Francisco. Freeway construction has been extended to Pacifica.

c. Route 92

Route 92, the Arthur Younger Freeway, is the east-west state route through the City of San Mateo. A four-lane freeway has been constructed on this right-of-way between US 101 and I-280. There are plans to improve the section between I-280 and Route 1 along the coast.

d. Interstate 380

Interstate 380 is the major link between I-280 and US 101 through San Bruno, primarily intended to serve San Francisco Airport. Construction is scheduled to be completed in 1975. There are plans to extend I-380 toward Route 1.

2. Implementation of Countywide Bus System (Planned)

a. Physical Characteristics

A comprehensive local bus system is planned for the entire county, including fixed routes, demand responsive transit, and special services (para-transit).

b. Operation and Service

Fixed route service is intended on forty-one routes, requiring 159 buses, not including spares. Minimum headways on El Camino would be scheduled for 10 minutes. Some bus routes are planned to operate 24 hours daily. Demand responsive, many-to-many service (14 hours daily) is envisioned for parts of Burlingame and San Mateo.

c. Utilization

Projections call for 65,000 passenger trips during an average weekday in 1977.

d. Operating Costs and Revenues

Estimated Operating Expenditures, 1975-1979 (excludes depreciation)	$57.7 million
Estimated Capital Needs, 1975-1979	27.3 million
Estimated Revenues, 1975-1979	35.7 million

e. Institutional Arrangements

In November 1974, San Mateo County residents approved a proposition to authorize formation of a transit district. Such a district would own and operate the countywide bus system and probably also ultimately absorb existing municipal bus systems. District directors have been elected, and the overall policies of the district are expected to be established shortly.

f. Fiscal Aspects

Eighty percent of the capital costs are expected to be covered by UMTA funds, 6% by FAU funds, and the remainder of the capital costs will come from TDA funds. About 62% of the operating costs will be covered by revenues from the bus operations, while the remaining operating expenses will initially come from TDA funds.

g. Year of Implementation

Pre-election plans called for establishing the transit district by January 1, 1975 with the inception of bus service by mid-1975.

3. Upgrading of Southern Pacific Commuter Railroad (Planned)

The Southern Pacific Railroad commuter service between San Jose and San Francisco has twenty-two trains in each direction on each weekday. Patronage consists of 11,000 commuters per day in each direction. A recent MTC feasibility study of upgrading the Southern Pacific concluded that an upgraded rail service can be a key component of the West Bay transportation corridor and that it appears feasible to increase the capacity of the rail service by upgrading its trains, tracks, stations, and service.

No specific schedule for upgrading the Southern Pacific Railroad commuter service has been established at the time of this writing. It is unlikely that a major upgrading of the rail service would occur prior to or in 1975.

E. Santa Clara County

1. Implementation and Expansion of Countywide Bus Service (Planned)

a. Physical Characteristics

A comprehensive bus system is being planned and currently implemented in the San Jose urban area. This system will provide local and express service initially along nineteen fixed routes complemented by demand-responsive service (dial-a-ride) for nineteen district zones in the county. The predominant function of this transit system is to provide local, intra-county service, rather than to establish regional connections between San Jose and other urban centers around the Bay, although service connections into Fremont (BART station) and East Palo Alto (San Mateo County) exist.

b. Operation and Service

The ultimate system will comprise about 100 buses for fixed-route service and ninety buses for dial-a-ride service. Headways will range from 15 to 60 minutes, depending on ridership potentials. Weekday service will be from 6 a.m. until 10 p.m., with less frequent service on weekends.

c. Utilization

Patronage in 1974 is expected to total approximately 2 million riders. On a regional basis, this represents 1% of the total transit patronage in an area comprising 21% of the regional population within a transit district.

d. Operating Costs and Revenues

Expected Operating Cost, 1974	$5.8 million
Expected Operating Revenue, 1974	2.4 million
Expected Operating Deficit, 1974	3.4 million

e. Institutional Arrangements

Planning, development, and operation functions of the Santa Clara County transit services are performed by the Santa Clara County Transit District (SCCTD), which was created in July, 1972 and acts under the direction of the County Board of Supervisors. Three previously existing bus companies, privately and municipally owned, were purchased in 1973 by SCCTD to form the backbone of the new system. SCCTD has no power of taxation and currently utilizes only UMTA and state TDA funds for capital improvements and transit operations.

f. Fiscal Aspects

In 1974, 42% of the operating expenditures are expected to be covered by fare box revenues, with the remaining 58% coming from TDA funds. The $9 million capital improvements will be covered by federal grants (40%), by TDA funds (25%), and by other sources not yet determined.

g. Year of Implementation

Formation of the Santa Clara County Transit District occurred in June, 1972. SCCTD operations started in January, 1973. Bus service is scheduled for full operation in 1975. In March, 1975, Santa Clara voters will vote on a proposition to give taxing power to the SCCTD.

2. Santa Clara Expressway Program

The rapid increase in population in Santa Clara County during the Sixties and early Seventies (the population increased by 66% between 1960 and 1970, reaching approximately 1.1 million) was met by a comprehensive highway construction program. Between 1962 and 1974, a total of approximately 110 miles of new freeways and expressways has been completed.

The unusual aspect of the Santa Clara Expressway program was its local financing. In 1961, a $70 million bond issue was passed, after gaining the support of all cities in the county. This bond issue permitted county expressways to complement federal and state construction programs to alleviate congestion.

Freeway and expressway links which were completed during this period (1962 to 1974) include:

- Completion of US 101 (Bayshore Freeway)
- I-280 to US 101 (Junipero Serra Freeway)
- I-680 (Northern Portion)
- Route 237 (Mountain View-Alviso Freeway)
- Route 85 (Stevens Creek Freeway) connecting US 101 and I-280
- Page Mill-Oregon Expressway
- Foothill Expressway
- Central Expressway
- Lawrence Expressway

- San Tomas Expressway
- Capitol Expressway
- Almaden Expressway

Most of these freeways, and especially expressways, serve the urbanized area of San Jose and Santa Clara internally. Only five of the twelve freeway routes connect San Jose/Santa Clara with other counties (US 101, I-280, Route 17). Partly as a consequence of the extensive highway implementation program, several attempts to form a transit district with taxing authority were defeated previously at the polls.

F. San Mateo Bridge/Dumbarton Bridge

1. Implementation of Transbay Bus Service Between Fremont-Palo Alto and Hayward-San Mateo (Planned)

No transit service across the Bay exists currently in this corridor. Although the provision of public transportation service between Fremont and Palo Alto (via the Dumbarton Bridge) and between Hayward and San Mateo (via the San Mateo Bridge) has been considered in several studies,[1] no service has been implemented so far or is likely to be implemented by 1975.

2. Reconstruction and Widening of San Mateo Bridge

During the late 1960's, the San Mateo Bridge was reconstructed and widened from a two-lane facility to four lanes with a median barrier. In its elevated portion, truck climbing lanes were added, bring the total cross-section to six lanes. In addition, the bridge approaches were appropriately upgraded, although not yet to freeway standards. The reconstruction was undertaken and financed by the State Division of Bay Toll Crossings. Current utilization of this bridge amounts to 33,000 annual average daily trips (1973).

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[1] San Mateo County Local Bus Transit Study, 1974; and Fremont, Newark, Union City Transit Study, 1974.

3. Reconstruction and Widening of Dumbarton Bridge (Planned)

This bridge represents the southern-most transbay link, connecting Newark, Fremont, and Union City on the east side to East Palo Alto, Menlo Park, and Palo on the west side. Presently, the bridge consists of a two-lane facility. Reconstruction and widening to four lanes has been authorized and is expected to be started in the near future by the State Division of Bay Toll Crossings. In 1973, the Dumbarton Bridge was used by an annual average of 12,000 vehicles.

APPENDIX C

THE INSTITUTIONAL ALTERNATIVES TO THE BAY AREA RAPID TRANSIT DISTRICT

The scenario of a No-BART alternative includes both a transportation alternative and a change in the political geography of the Bay Area. In the absence of BART, a regional political entity, the Bay Area Rapid Transit District, would not exist. The GNBA, then, must consider the question of whether transportation systems would have been implemented by political and operating authorities which exist today, with the exception of BART, or whether the influences and forces which affected events during the past 20 years would have advocated, and effectuated, a different geography of political jurisdictions and responsibilities to implement the GNBA.

This appendix describes institutional mechanisms that should be considered as likely alternatives to the Bay Area Rapid Transit District. The institutional alternatives (i.e., the agency, or combination of agencies, that might have developed for the delivery of Bay Area transportation services) assume a system other than fixed-rail. Naturally, this assumption permits the consideration of more fractionalized organizational alternatives to BARTD, since bus or highway-oriented transportation systems permit local authorities to provide services, while the construction of fixed guideways, regionally, essentially requires a regional entity. Each of the alternatives we have considered has been described in terms of its service responsibilities, organizational process, and the assumptions necessary for the associated scenario to result in the respective institutional alternatives. The alternatives and related local taxation alternatives are also summarized in Table C-1.

A. Regional Planning and Operating Agency for All Transit Operatio

1. Service Responsibility

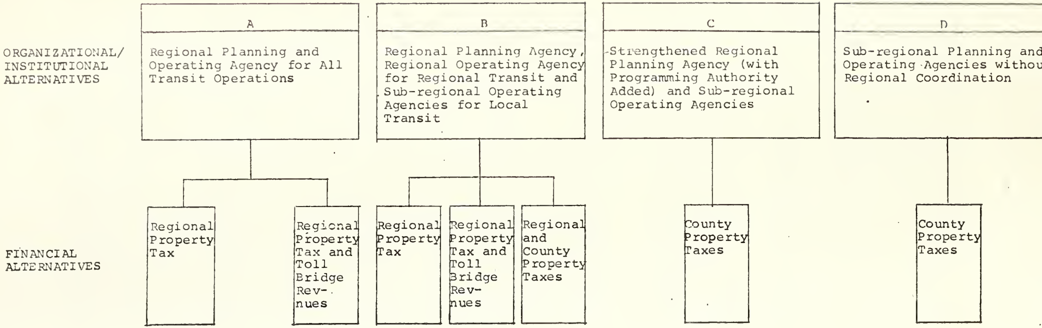
This alternative would consist of a single agency responsible for all transit operations within at least the BART counties. It would differ from the existing situation in that the agency would provide local as well as interurban service, and it would operate non-fixed rail transit alternatives (i.e., buses and ferries).

Such an agency's operating responsibilities would be limited to transit vehicles, since it would not have unilateral decision control over ancillary components in a comprehensive transportation "system" (e.g., road improvement, bridge expansion and/or busway development).

Expenditure decisions -- and, to a large extent, implementation responsibility -- for such components would continue to rest with a variety of agencies at the federal, state, and local levels. Integration of transit and highway elements would be a cooperative multi-agency process achieved through inter-agency agreements negotiated pursuant to a regional transportation plan under the existing MTC umbrella. While this regional transit operating agency would not have unilateral decisional or implementation

TABLE C-1

INSTITUTIONAL AND FINANCIAL ALTERNATIVES


ORGANIZATIONAL/ INSTITUTIONAL ALTERNATIVES
FINANCIAL ALTERNATIVES
A
Regional Planning and Operating Agency for All Transit Operations
Regional Property Tax
Regional Property Tax and Toll Bridge Rev-nues
B
Regional Planning Agency, Regional Operating Agency for Regional Transit and Sub-regional Operating Agencies for Local Transit
Regional Property Tax
Regional Property Tax and Toll Bridge Rev-nues
Regional and County Property Taxes
C
Strengthened Regional Planning Agency (with Programming Authority Added) and Sub-regional Operating Agencies
County Property Taxes
D
Sub-regional Planning and Operating Agencies withou
Regional Coordination
County Property Taxes

Source: McDonald & Smart, Inc.

authority for such non-transit elements as freeway construction, highway improvement, etc., nothing would preclude the agency's financial participation in the construction and operation of components related to efficient transit vehicle operation (e.g., exclusive bus lanes). To some extent, this alternative is comparable to the proposed Golden Gate Transportation Commission.

2. Organizational Process

Such a regional operating agency might come into being in one of two ways:

- A transportation district could be formed consisting of the participating counties. The district would adopt a property tax for transit which would be uniform throughout all of the counties in the district. The district would acquire all of the existing transit operations.
- A regional operating agency would come into being through a joint exercise of powers agreement among all of the existing transit agencies. Each agency would contribute financially to a central staff which would be responsible for overall planning and programming in such areas as route determination, fare structures, federal grant acquisition, scheduling, etc. Each agency would continue to be responsible for its own basic financing (presumably excluding federal and state grant acquisition). Such financing would be based upon tax rates in the constituent service areas

which might not be uniform in all of the counties, and which presumably would be related to level-of-service needs, as measured by population totals and densities in the constituent service areas.

3. Assumptions Necessary for Implementation

Development of this institutional alternative would have depended upon the following assumptions:

- Existing systems' patronage would have continued to decline while costs were continuing to rise, and the resulting operating deficits would have motivated the various agencies to seek consolidation.

- Improved bus service would have been recognized by state, regional, and local transit officials as a viable technical alternative to an advanced technology rail system. (This is an important assumption because, until fairly recently, many transit planners had come to regard buses as obsolete, hopelessly unattractive, and incapable of inducing travelers to shift from private automobile travel to public transit. It is only recently that bus transit has regained stature through improved design, operations, and marketing.

- The concept of improved, expanded, and regionally coordinated bus service would have had sufficient consumer attractiveness to create public support for increased taxes. Our interviews of key actors in the history of BART have confirmed, without exception, the assumption that only an advanced technology "super system" could have generated sufficient excitement to induce public support for substantial taxes earmarked for transit. The argument that, given a sophisticated promotional effort, a less capital-intensive system would have resulted in the participation of more counties in the regional institution is not universally plausible. While A.C. Transit gained popular support at the ballot box in the late 1950's, it could not gain support for expansion of local service in 1974. On the other hand, neither San Mateo nor Santa Clara counties were able to gain public support for transit systems until the past two years, and both still lack support for transit explicitly financed by the property tax. This could be reflective of either a lack of public enthusiasm for bus transit or an inadequate marketing program.

B. Regional Planning, Regional Operating Agency for Interurban Transit and Sub-Regional Operating Agencies for Local Transit

1. Service Responsibility

This institutional alternative basically is what exists today, i.e., a regional interurban transit system combined with local service provided by local operating entities. The only difference in the alternative is in the technology. Interurban service would be provided by buses in lieu of BART's fixed-rail system.

2. Organizational Process

This institutional alternative would not involve any unique organizational modes beyond those which presently exist. The most likely candidate for the interurban system, given its previous explicit responsibility for interim transbay service (prior to BART), would have been A.C. Transit. However, because of the possibility that a less expensive system would have resulted in a regional agency including more counties than BART, possible expansion of A.C. Transit in terms of political jurisdiction as well as levels of service should be considered.

3. Assumptions Necessary for Implementation

- Tax increases sufficient to raise bus service to a level at least marginally competitive with the BART concept would have been voted by the public. As indicated above, this is not considered unrealistic.
- Individual transit agency operators would not have taken the initiative to consolidate their systems -- whether through fundamental reorganization or through systematic coordination of operations. Lacking a clear sense of crisis and lacking the initiative taken by groups like the Bay Area Council in the creation of BART, neither operators nor legislators would have moved toward consolidation of interurban and local transit.

C. Strengthened Regional Planning Agency (with Programming Authority Added) and Sub-Regional Operating Agencies

1. Service Responsibility

In this alternative, there would be no regional BART-like operating agency. Expanded local service, with heightened levels of service, would continue to be provided by such operations as Muni, Golden Gate Transit, and A.C. Transit, with the latter continuing to provide transbay service between the East Bay and San Francisco. The feasibility of this alternative as a transportation solution is evident from the success with which A.C. Transit fulfilled travel demand with BART transbay service commenced. After all, transbay travel demand was essentially a non-BART environment through 1974. The argument that in a non-BART environment there would be latent demand for rapid transit among congestion-plagued automobile commuters -- who, in turn, would demand and be willing to finance any solution to congestion -- can be dismissed with the evidence of a mere 5% decrease in peak hour vehicle traffic on the Bay Bridge since BART's transbay service was implemented.

2. Organizational Process

This alternative combines continued autonomy in the operating agencies with materially strengthened powers in the regional planning agency (in this case, presumably MTC). Under this model, MTC would have the staff capability and/or consultant purchasing capability to do operational planning as well as short- and long-term planning for all sub-regional systems. The initiative for, and control of, technical studies for determining such issues as routing, levels of service, patronage projections, population growth projections, land use implications, trip origin and destination studies, and all other major issues relevant to system design, expansion, equipment needs, etc., would rest with MTC. Satisfaction of the criteria for both federal and state assistance for various sub-regional transportation components would be determined regionally. This would be distinct from the situation today, in which MTC's annual program is largely the product of a collation process involving each of these sub-regional agencies' submission of their own programs and grant applications.

The consequences of this alternative could be achievement of a de facto integrated and comprehensive regional transportation "system" through control of priority-setting and system expansion, and through a strengthened planning process combined with control of non-local funds. However, along with this regionalization of all major decisions, sub-regional agency autonomy would be preserved in operation of the systems. The basic financing of the sub-regional system would continue to be derived from local property taxes. The integration of the regional transportation planning and programming process might result in full nine-county coordination, in essence regionalizing transit to both BART and non-BART counties under the GNBA environment.

It is also conceivable, of course, that the programming authority the regional transportation planning agency should have would not be delegated by the operating agencies. The result would be a primary agency comparable to today's MTC. Nonetheless, the physical components of the GNBA considered in this study would not be altered by the delection of programming powers.

3. Assumptions Necessary for Implementation

- In the absence of either new technology systems or approaching bankruptcy among the existing local systems, there would have been insufficient motivation for either local operators or the state Legislature to create complete regionalization of transit operations through system consolidation.

- On the other hand, the alternative assumes that sufficient awareness existed of an approaching transit crisis and of deepending financial problems among transit agencies, to provide the momentum for strengthened regional planning and priority-setting powers.

- In the absence of a monumental system like BART, which had developed as a power center of its own, a regional planning agency would have been able to achieve greater powers much earlier, particularly in priority-setting.

Where total regionalization of operations is politically impossible, the degree of fractionalization among operating agencies paradoxically can support the development of stronger regional powers in planning and priority-setting. This is because of the absence of a strong power center at the operational level whose needs would take priority over regional planning and programming.

- With perceptions developing of a deepening "transit gap" in the Bay Area, and in the absence of a regional operating agency, both federal and state agencies would have recognized that, in order to develop regionwide services that are both efficient and economic, an agency with strong planning and priority-setting powers would be essential. Accordingly, federal and state funding agencies would have maximized the regional agency's control of funds and would have provided a budget sufficient to support an in-house capability to do transit programming as well as planning.

D. Sub-Regional Planning and Operating Agencies Without Regional Planning and Coordination

1. Service Responsibility

This alternative would include atomized local bus and ferry operations with no coordinated line-haul service, nor with a regional transportation coordinating agency.

2. Organizational Process

This alternative assumes the present organization of the existing Bay Area transit agencies without a BART District. It also assume no regional planning and coordination responsibility by an MTC-like entity.

3. Assumptions Necessary for Implementation

- Existing tarnsit agencies would have responded adequately to pressure to provide means for reducing automobile congestion.

- The federal government would have provided grants to existing sub-regional agencies without regional planning and coordination. This assumption, however, is undermined by the federal requirements for continuing cooperative and comprehensive planning as a prerequisite for the funding process.

APPENDIX D

LIST OF SELECTED REFERENCE AND SOURCE DOCUMENTS

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OFFICIAL BALLOT ARGUMENT ON PROPOSITION A
June 6, 1972

A Shall the California Toll Bridge Authority be permitted to construct the southern crossing bridge without further specific approval by the California Legislature?	**YES**	
	NO	

(For full text of measure, see page 18, Part II)

General Analysis by the Legislative Counsel

A "Yes" vote on the question submitted to the voters of the San Francisco Bay Area counties pursuant to this measure is a vote to continue the present power of the California Toll Bridge Authority to construct the Southern Crossing Bridge across San Francisco Bay without further specific approval by the Legislature.

A "No" vote is a vote to prohibit the California Toll Bridge Authority from constructing the Southern Crossing Bridge without further specific approval by the Legislature.

For further details, see below.

Detailed Analysis by the Legislative Counsel

Under existing law, the California Toll Bridge Authority may authorize and direct the Department of Public Works to construct the Southern Crossing Bridge across San Francisco Bay whenever, in the opinion of the authority and of the department, it is necessary or desirable to do so.

This proposition submits to the voters of the City and County of San Francisco and the Counties of Alameda, Contra Costa, Marin, San Mateo, and Santa Clara the question of whether the California Toll Bridge Authority should be permitted to construct this bridge without further specific approval by the Legislature.

If a majority of the voters voting on the question vote "Yes," the Southern Crossing Bridge may be constructed without further specific approval by the Legislature, under the existing law.

If a majority of the voters voting on the question vote "No," the Southern Crossing Bridge cannot be constructed without further specific approval by the Legislature.

Cost Analysis by the Legislative Analyst

Existing law authorizes the Toll Bridge Authority to issue revenue bonds, supported by tolls, to build the Southern Crossing Bridge. This measure makes the continuation of that authority contingent upon the approval of the voters in the district affected. Since the authority now exists and a "no" vote would impose a moratorium on that authority, there is no added element of cost.

It is estimated by the Department of Public Works that the cost of the bridge structure, connections, and the north and south approaches on the east side of the Bay would be $422 million. The cost of approaches on the west side of the Bay is estimated to be $223 million. Thus, the total project cost, exclusive of bond interest charges, will be $645 million. Of this amount, $354 million will be the share of the Division of Bay Toll Crossings to be financed by revenue bonds, supported by bridge toll revenues, and $291 million will be the share of the Division of Highways to be financed from highway users tax revenues in the State Highway Account.

Argument Urging a "Yes" Vote on Proposition A

VOTE YES . . . TO PROVIDE A CRITICALLY NEEDED FACILITY

The need for the new crossing is urgent. You don't have to be an expert to know that the Bay Bridge is overloaded to the point of being unable to handle traffic demands. Frequent stalls block traffic lanes and cause congestion on a facility already far beyond capacity. Daily congestion causes traffic delay estimated to cost the public over $6 million a year in time lost and operating expense. Minimum Bay Area growth makes it essential that steps be taken now to handle anticipated traffic; otherwise, intolerable congestion is sure to result with an inevitable deteriorating effect upon the living environment and economy of the Bay Area. This bridge is not located or designed to handle downtown commuter traffic but as a bypass for the through traffic.

VOTE YES . . . TO PERMIT THE BAY BRIDGE AND A NEW SOUTHERN CROSSING TO PROVIDE OPTIMUM TRANSPORTATION SERVICE

All plans to provide the ultimate solution to Bay Area transportation woes contain three ingredients: the Bay Bridge, mass transit facilities and the Southern Crossing. All forms of transportation and the Southern Crossing are necessary to significantly reduce the Bay Bridge congestion.

The Southern Crossing will relieve the San Francisco City Streets and highways by providing a more direct route and by serving as a bypass for trucks and through traffic, which are now channeled through downtown areas. It will divert 36 percent in the traffic demand from the Bay Bridge.

VOTE YES . . . TO PROTECT THE ECONOMY OF THE BAY AREA

An additional crossing is essential for the flow of necessary goods and services within the Bay Area community. Without adequate transportation facilities, living costs within the Bay Area will necessarily continue to spiral. A "yes" vote will also provide work right now for the laboring man and those who supply his needs.

VOTE YES . . . TO ENHANCE THE ENVIRONMENT OF THE BAY AREA

An additional bridge will reduce traffic congestion, shorten motor vehicle trips, reduce total number of miles driven; all of which will necessarily reduce air pollution.

The bridge has been designed with the aid of outstanding architects and has been designed to give bridge users a unique panoramic view of the bay. It will be a most worthy addition to the family of magnificent bridges that have gained world renown for our scenic San Francisco Bay Area.

THE ARGUMENT FOR DELAY BY THE COAST GUARD IS NOT BASED ON ENVIRONMENT WHATSOEVER.

RANDOLPH COLLIER
Senator, 1st District

CLARK L. BRADLEY
Senator, 14th District

WALTER POWERS
Assemblyman, 1st District

Rebuttal to Argument Urging a "Yes" Vote on Proposition A

The proponents of a southern crossing bridge claim that a new bridge is necessary to reduce bay bridge congestion. The falsity of this argument is evident. The best evidence is that rapid transit which encourages people to leave automobiles at home is the best way to reduce automobile congestion. Evidence shows that construction of new bridges breeds additional freeways and that this again encourages increased use and numbers of automobiles. The proponents claim that San Francisco city streets and highways would be relieved by the construction of a southern crossing. The Board of Supervisors of San Francisco is on record against a southern crossing. A southern crossing bridge in their best judgment will increase automobile traffic into the City of San Francisco.

The proponents argue that work will be provided for labor in the bay area by the construction of the southern crossing. What they fail to state is that the money used for a southern crossing, if used to extend the BART Rapid Transit System, would not only help solve traffic congestion but should provide far more jobs and give more aid to the economy than the construction of another bridge. The last argument of the proponents is the most ludicrous of all—that an additional bridge would reduce traffic congestion and reduce air pollution. Experience shows that bridges encourage the use of automobiles and that increased automobile use increases pollution. Vote no on the southern crossing bridge.

ROBERT W. CROWN
Assemblyman, 14th District

DIXON ARNETT
Assemblyman, 26th District

RICHARD D. HAYDEN
Assemblyman, 22nd District

Argument Urging a "No" Vote on Proposition A

The proposition asks the question, "Shall the California Toll Bridge Authority be permitted to construct the Southern Crossing Bridge without further specific approval by the California Legislature?"

The people of Alameda, Contra Costa, and San Francisco Counties have pledged themselves to spend in the neighborhood of $1 billion for the rapid transit system known as BART. One of the strong arguments presented to the people to secure their approval was that BART would discourage the use of the automobile and thereby do something to improve the present conditions of air pollution, noise pollution, and the pollution of space. The voters approved the expenditure and we can expect BART to be substantially completed in 1972.

To ask the people to spend another half billion dollars for a southern crossing bridge which would encourage the use of the automobile and contribute directly to air, noise and space pollution would be foolhardy in the extreme, Construction of the bridge also could lead to the construction of additional, expensive freeways along the shore of San Francisco Bay.

Communities at both ends of the proposed bridge have taken positions against it. On the east side of the bay, the Cities of Alameda and San Leandro, and on the west side the Counties of San Mateo and San Francisco have officially opposed building the bridge now. Joining with them in opposition are the Cities of Fremont, Piedmont, Berkeley, Livermore, Newark, Hayward, Redwood City, San Jose and Richmond.

The bill placing this issue before the voters of six Bay Area Counties passed both the Assembly and the Senate with overwhelming votes. It passed the Assembly 54–8 and the Senate 31–2.

To build another bridge now, and incur tremendous expense before BART has an adequate opportunity to show its effect on the transportation needs of the Bay Area is unwise and not in the public interest. We respectfully request a "no" vote on the proposition.

ROBERT W. CROWN
Assemblyman, 14th District
DIXON ARNETT
Assemblyman, 26th District
RICHARD D. HAYDEN
Assemblyman, 22nd District

Rebuttal to Argument Urging a "No" Vote on Proposition A

The argument urging a "No" vote on this measure infers that the people in the Bay Area would have to spend another one-half billion dollars for the Southern Crossing Bridge and the source of funding for this money is not mentioned. It should be made clear that the cost of this bridge will not come from sources such as the property tax, sales tax, or income tax, but will be funded solely by tolls on some of the Bay Bridges and that the tolls will be paid in the manner in which they are now paid; namely, pay as you drive.

It should also be pointed out that the money used in the construction of the bridge will be a tremendous help to the economy of the Bay Area, including many months of work for many people in the area.

Moreover, the purpose of the Southern Crossing is not to compete with BART but to decrease the congestion which now exists and which will get worse on the Bay Bridge. As a matter of fact, it has been indicated that many of the trucks now using the Bay Bridge will prefer to use and will use the Southern Crossing.

RANDOLPH COLLIER
Senator, 1st District
CLARK L. BRADLEY
Senator, 14th District

APPENDIX F

By The
Metropolitan Transportation Commission

SURVEY OF TRANSPORTATION DECISION-MAKING IN SELECTED METROPOLITAN AREAS

A. Introduction

MTC staff personnel have made a brief survey of transportation decision-making in several other metropolitan areas in order to obtain information on decisions relating to rapid transit, bus service, and highway construction during the period when BART was being planned and built. This information will help to place the Bay Area's decisions within a national perspective and especially to throw light on a key question: To what extent would a decision against BART have led to expanded highway construction or major improvements in bus service as alternative means of improving travel conditions?

Such a survey would ideally include all metropolitan areas which fulfill two criteria: (1) they made a public choice about a new regional rail rapid transit system within the same time frame as the Bay Area's decision on BART, and (2) they are comparable to the Bay Area in form and character.

Five areas which meet the first criterion were defined: Los Angeles, Seattle, Washington, D.C., Baltimore, and Atlanta.

Areas such as Philadelphia and Chicago were excluded because they already had well-established rail rapid transit systems.

There is no easy way to judge the "comparability" of one metropolitan area to another. Each metropolitan area is a unique blend of geography (location), topography (natural features), and history (settlement, development, and institutional patterns). It cannot be claimed that the areas chosen under the first criterion above are "like" the San Francisco Bay Area in any sense but one: they are all among the 34 metropolitan areas which had 1970 Census populations over one million, and therefore contain a broad spectrum of urban activities, a highly complex set of interactions among those activities, and a wide variety of population types.

However, it is fair to say that all of these areas share one or more of the distinctive features of the Bay Area: a center of commerce, finance, and government; also containing a substantial industrial base; a transportation hub; containing a sizable minority-group population; located on a large body of water; physically and culturally a part of the West Coast. Of the five other areas, Seattle perhaps has the most in common with the Bay Area.

The areas so chosen are described and compared with the part of the Bay Area that contains BART in the following table:

Area (SMSA)	1970 Population	Rank Among SMSA's	Decision on Rapid Rail
Los Angeles-Long Beach	7,032,000	2	Against
San Francisco-Oakland	3,110,000	6	For
Washington, D.C.	2,909,000	7	For
Baltimore	2,071,000	13	For
Atlanta	1,598,000	18	For
Seattle-Everett	1,422,000	19	Against

Two approaches were followed in gathering information for this survey. The first involved a brief search of the available literature (including news articles). This was the primary source of information on the Seattle and Los Angeles experiences. The second involved interviews with personnel in the transit planning and operating agencies in Washington, Baltimore, and Atlanta.

B. Findings

1. Los Angeles

In November, 1968, Los Angeles voters failed by a wide margin to approve a bond issue for a $2.5 billion, 85-mile rapid transit system with 65 stations and 756 cars, along with a fleet of 850 buses to travel over 300 miles of surface routes. (Forty-five percent approved; 60 percent was needed for passage.)

However, this action did not lead to a further concentration on highway development. Indeed, under citizen pressure, the State Legislature began removing some key freeway sections from the State Highway Plan, including a major freeway along the Pacific Coast.

Los Angeles did make a significant move toward high-speed transit service in one of the corridors that would have been served by the proposed rapid transit system. An exclusive bus lane was installed in the median of the San Bernardino freeway. This $53 million, 11-mile project was completed in 1974.

An additional one-half cent sales tax was also enacted to hold down local bus fares and fund some improvements in bus service.

In November, 1974, voters again rejected an even more ambitious rail rapid transit and express bus system with a price tag of $6 to $8 billion.

2. Seattle

In November, 1969, voters rejected a proposed rapid transit system to be funded by a real property tax. Again, in June, 1970, voters turned down a $1.3 billion system of 46 miles of rail and 80 miles of express bus routes.

As in Los Angeles, rejection of rapid transit did not lead to expanded highway construction. Instead, two major highway links were put to a vote of the people, who rejected them.

Like Los Angeles, Seattle launched an innovative express bus service during this period -- the "Blue Streak" suburb-to-downtown service. Free transit service was inaugurated in downtown Seattle in 1973.

3. Washington, D.C.

A 1959 report by the National Capitol Regional Planning Council recommended construction of a large network of freeways and parkways (329 miles), a rail rapid transit system (33 miles) and radial express bus routes on freeways and surface streets (66 miles).

A 25-mile rapid transit system, proposed by an interim Federal agency set up to plan the system, was accepted by Congress in 1965, and in 1966 an interstate compact forming a new agency was adopted. This agency, the Washington Metropolitan Area Transit Authority (WMATA) adopted a plan for a 98-mile system in March, 1968. The necessary bonds were put to a vote in the Virginia suburbs and in one of the Maryland counties and approved.

The WMATA took over the four privately owned bus companies in 1973. A sizable express bus operation to the Virginia suburbs is making use of the bus-only middle lanes of the expanded Shirley Highway, orginally intended as reversible lanes for general traffic.

The planned Beltway and a few other freeway links were built, but by 1970, freeway construction in all parts of the metropolitan area had been brought to a halt by citizen opposition in which the prospective availability of rapid transit was not among the main arguments.

4. Baltimore

In 1964, a rail rapid transit system and improved bus service were proposed for the region. The Metropolitan Transit Authority (MTA) was established in 1969. The MTA began the acquisition of the existing bus companies in 1970, and has since bought all of them.

In early 1971, MTA adopted a "Phase I," 28-mile rapid transit system. Later in 1971, MTA was absorbed into the new Maryland Department of Transportation as the Mass Transit Administration (still "MTA"). Rapid transit is funded by the state, mainly from gasoline tax revenues. No referendum was held on rapid transit.

The original Interstate highway plans for the Baltimore area called for substantial construction in the city. Broad community opposition led to the abandonment of most freeways inside the Beltway.

5. Atlanta

A 1952-1954 regional plan called for a single, very large downtown center, with a rapid transit system to support it. Since then, there has been no real questioning of the need for regional rapid transit, but only an exploration of design and funding alternatives. After the formation of the Metropolitan Atlanta Rapid Transit Authority (MARTA) in 1966, the examination of alternatives was conducted in the period 1967-1969. Several systems (bus, rail, mixed) were examined. A busway proposal was seriously considered due to the influence and prestige of the principal local bus operator.

MARTA went to the voters in a 1968 referendum which did not mention bus service. The referendum failed, possibly due to the fact that alternatives were still under study, but also because of the focus on the property tax as the primary local funding source.

In 1971, MARTA again went to the voters with a proposal for rail rapid transit and immediate improvement of bus service, to be financed by a sales tax, and was successful. MARTA promptly acquired the one major bus operation, lowering fares in the next two months to 15¢ and purchasing 500 new buses in the next two years. The lower fare proposal was effective in gaining the support of the low-income, center-city residents.

Rapid transit is used frequently as an argument against both highway and arterial street construction or improvements. Two major highway links were dropped immediately after the referendum in 1971, and removal of these central links caused other highway segments in the previous plans to be dropped as well.

C. Conclusions

Of the five areas surveyed, only Atlanta appeared to clearly link adoption of rapid transit to rejection of new highways. Even in that case, it seems that community concern for preserving existing values and restricting new development may have been the primary motivation, and support for transit the most readily available and acceptable means to that end. Even as plans for the MARTA stations proceed, there is strong community opposition to allowing intensive redevelopment of the areas around the stations.

In general, highway proposals have been rejected in these metropolitan areas with or without parallel development of rapid transit alternatives. Also, in all cases investigated here, there was no evidence of a direct "trade-off" occurring between transit and highway investment choices. Except for the case of the MTA in Baltimore, there was no single decision point established for such debate and no central funding source for allocating resources between the two modes.